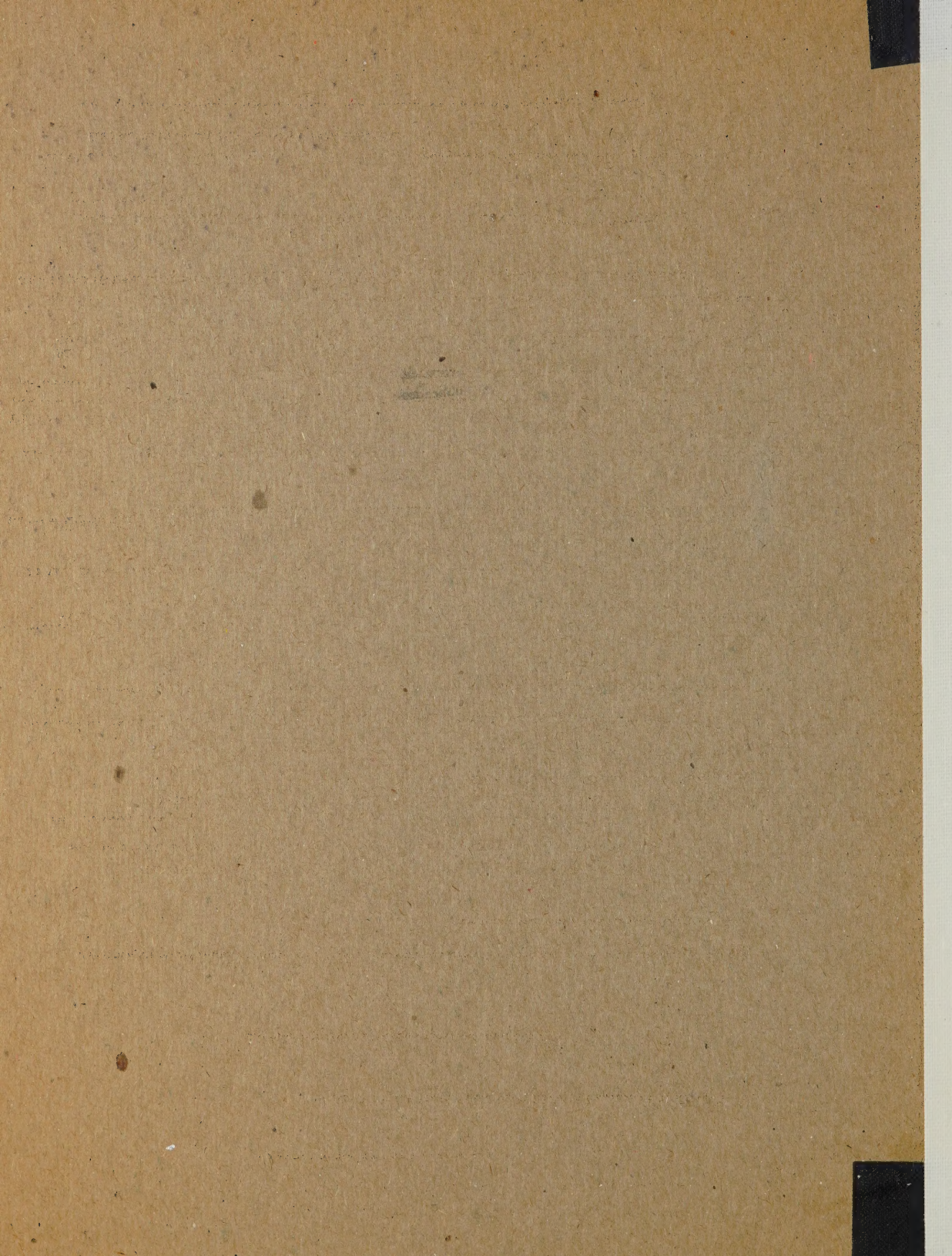


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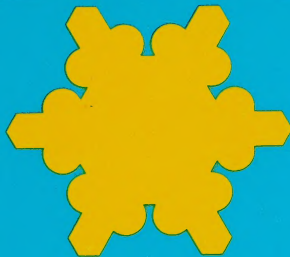
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1970 Government  
Activities  
in the North

Advisory Committee on  
Northern Development



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# 1970 Government Activities in the North

1970 Report and 1971 Plans

Advisory Committee  
on Northern Development

This report is also available  
in French  
Cette publication existe aussi  
en version française

Government  
Publications

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GS/



## FOREWORD

Much of the material used under the headings 'Plans for 1971' had to be assembled in 1970. By the time this document is published, many of these plans will be 'fait accompli'; others may have been severely modified or abandoned. It is not practicable to constantly review the status of these plans as publication of the book proceeds; consequently, they are treated throughout as being in the future.



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MEMORANDUM FOR THE ADVISORY  
COMMITTEE ON NORTHERN DEVELOPMENT

Document ND 503

Government Activities in the North-1970  
and plans for 1971

On January 22, 1953, the Cabinet directed that the Advisory Committee on Northern Development report immediately and periodically thereafter on all phases of development in the Canadian north. The Committee agreed the report should be brought up to date on an annual basis.

This report covers the activities of all federal departments and agencies operating in both Territories for the year 1970 and outlines their plans for 1971.

Due to the co-operation of its many contributors, the report has increased in popularity and is widely used as a work of reference.

It is unclassified and copies can be obtained in either French or English by writing to the Information Services, Department of Indian Affairs and Northern Development, Ottawa, Ontario K1A 0H4.

L.A.C.O. Hunt  
Secretary

Advisory Committee on Northern Development  
Centennial Tower  
400 Laurier Avenue West  
Ottawa, Ontario K1A 0H4  
Canada



## ADVISORY COMMITTEE ON NORTHERN DEVELOPMENT

### Responsibilities

To advise the government on questions of policy relating to civilian and military undertakings in northern Canada, and to provide for the effective coordination of all government in that area.

### Review of 1970 Operations

There were six meetings (76 to 81 inclusive) of the A.C.N.D. held during 1970. During the year, 17 reports or documents were circulated with the most important entitled "National Objectives for Northern Canada" being submitted to the Cabinet for consideration.

The A.C.N.D. reactivated the following sub-committees in 1970:

- Transportation Sub-Committee  
Chairman — Mr. H.M. Walsh of M.O.T.
- Sub-Committee on Science and Technology  
Chairman — Dr. J.M. Harrison of E.M.R. (Dr. R.F. Roots a.i.)
- Sub-Committee on Northern Communications  
Chairman — Mr. D.S. Loftus of D.O.C.

The Co-ordinating Sub-Committee under the chairmanship of Mr. A.D. Hunt, Assistant Deputy of Indian Affairs and Northern Development, held six meetings during the year.

During the year, three events of some significance took place partly under the auspices of the Committee.

In Montebello, Quebec, the Sub-Committee on Science and Technology held a conference of Canadian and American scientists to consider ways in which it might be mutually advantageous to cooperate in Arctic research.

As 1970 was Centennial year in the Northwest Territories, two major conferences were held in Yellowknife, the capital. The first was a comprehensive conference on Northern Communications and their impact in the north for the next

decade. The second conference was devoted to "Arctic Transportation in the 1970s". Apart from the active participation in both conferences by government departments and contributions from the private sector, there was considerable participation by the people of both territories from all the ethnic groups.

There were a number of ad hoc committees and working groups established during the year under the auspices of the A.C.N.D. to deal with various aspects of regulations and development programs for northern Canada. They included:

- Task force on organization of a multi-lateral conference on Arctic Problems.
- Working group on land use regulations.
- Working group on regulations for Arctic Waters Pollution Prevention Act.

The Commissioners of both the Yukon and Northwest Territories were admitted as full members of the Advisory Committee on Northern Development.

Government departments and agencies who were not directly involved in northern development heretofore, but now find themselves committed to programs involving the two territories, have become members of the main committee or its sub-committees. The membership of the main committee is as follows:

Deputy Minister of Indian Affairs and Northern Development (Chairman)  
Deputy Minister of Agriculture  
Deputy Minister of Supply & Services  
Chief of Defence Staff — National Defence  
Chairman of Defence Research Board  
Deputy Minister of Energy, Mines and Resources  
Under-Secretary of State for External Affairs  
Deputy Minister of Public Works  
Deputy Minister of Finance

Deputy Minister of Fisheries & Forestry  
Deputy Minister of Manpower & Immigration  
Deputy Minister of National Health & Welfare  
President of the National Research Council  
Secretary to the Cabinet — Privy Council Office  
Commissioner of the Royal Canadian Mounted Police  
Deputy Minister of Transport  
Secretary of the Treasury Board  
Deputy Minister of Communications  
Science Adviser — Privy Council Office  
Deputy Minister of National Defence  
Chairman of Canadian Broadcasting Corporation  
Commissioner of the Northwest Territories  
Commissioner of the Yukon Territory  
Secretary of the Advisory Committee on Northern Development

## CANADA DEPARTMENT OF LABOUR

### Responsibilities

Conciliation and other services for maintaining good industrial relations; administration of employment standards, fair employment practices, female equal pay and employment safety legislation; compensation to Public Service employees for occupational injury or illness; surveys of wage rates, hours of labour, and other working conditions.

### Long-term Plans

Normal planning to meet responsibilities.

### Review of 1970 Operations

### Industrial Relations

Conciliation and arbitration proceedings: three disputes were mediated in the Northwest Territories, and two in the Yukon Territory.

### Representation Proceedings

In 1970 the Canada Labour Relations Board processed 15 applications from trade unions for certification as bargaining agents of units of employees of companies operating north of the sixtieth parallel. Thirteen of the applications affected units of employees in the Yukon Territory and two affected units of employees in the Northwest Territories.

In the two territorial areas, the Board issued nine certificates, rejected one application and permitted the withdrawal of five.

A table giving particulars of the Board's activities in these two territorial areas is attached.

There are no plans to expand the activities of the Employee Representation Branch in the North. These activities are governed entirely by the number of applications submitted to the Canada Labour Relations Board.

### Accident Prevention and Compensation

In addition to its long-standing activities in the Yukon and Northwest Territories with respect to the administration of the Government Employees Compensation Act, the Accident Prevention and Compensation Branch of the Department has,

in 1970, made considerable progress towards the implementation of a comprehensive employment safety program in premises of employers subject to the Canada Labour (Safety) Code as well as in Public Service premises under the authority of the Occupational Safety Policy for the Public Service of Canada.

### Accident Prevention Division

#### *Surveys*

Twenty-five locations in the Yukon and 95 locations in the Northwest Territories, involving both enterprises subject to the Canada Labour (Safety) Code and federal establishments subject to Treasury Board's Occupational Safety Policy, were visited during the year for the purpose of detecting and correcting violations of good safety practice and to otherwise assess the effectiveness of accident prevention programs.

#### *Safety Training*

One hundred and seventy employees in the Yukon and 167 in the Northwest Territories of federal enterprises and departments received first-aid training. In addition, 29 employees in the Northwest Territories attended a two-day seminar for supervisors.

#### *Mechanical Inspections*

Fifty-three boilers, 123 pressure vessels and 6 refrigeration plants in the Northwest Territories were inspected during the year.

### Accident Compensation Division

Claims of federal government employees, usually employed in the Yukon and Northwest Territories, for compensation for occupational accidents or diseases were received in the Branch and forwarded to the Workmen's Compensation Board of Alberta for adjudication and payment under a federal-provincial arrangement. A total of 524 claims were received and disbursements were \$155,280.

**Federal Contracts**

## — Inspections on Government Contracts:

During 1970 thirty-one inspections were made by Branch officers. Of these, 22 were made in the N.W.T. and nine in the Yukon. These inspections directly affected 29 main contractors and 17 sub-contractors. Wage adjustments involving \$70,874.52 were collected from five main contractors and paid to 100 employees. From two sub-contractors, \$171.64 was collected and paid to nine employees.

## — Wage schedules issued:

	N.W.T.	Y.T.
Construction	72	43
Service	3	—

**Standards Division**

It should be noted that the provisions of the Code do not apply to a work, undertaking or business of a local or private nature in the Yukon Territory or the Northwest Territories. The Territorial Councils have issued ordinances respecting employment standards in activities that fall within their jurisdiction.

In the Yukon and Northwest Territories, responsibility for investigation of complaints under the Code has been assigned to the Labour Standards Branch regional offices in Winnipeg, Edmonton and Vancouver, as follows:

<i>Territory</i>	<i>Responsible Regional Office</i>
— Northwest Territories (east of 102° longitude)	Winnipeg, Manitoba
— Northwest Territories (west of 102° longitude)	Edmonton, Alberta
— Yukon	Vancouver, British Columbia

Complaints may relate to Part I of the Code (Hours of Work), Part II (Minimum Wages), Part III (Annual Vacations) and/or Part IV (General Holidays). During 1970, the complaints investigated under the Code numbered three in the Northwest Territories; there were none in the Yukon. The total amount of money recovered from employers as a result of these investigations was \$1,206, of which \$522 was recovered under the provisions of Part I of the Code, \$208 under Part III, and \$476 under Part IV.

**Economics and Research**

The Economics and Research Branch conducts two annual surveys of employers in Canada, one on wage rates, salaries and standard hours of labour, the other on working conditions. The surveys included thirty-seven establishments in the Yukon Territory of which twelve are under federal jurisdiction and fifty-five in the Northwest Territories of which nineteen

are under federal jurisdiction. These two regions were also included in a special study on the distribution of employees by wage and salary rates in industries under federal jurisdiction in connection with the Canada Labour (Standards) Code. The Branch also maintains a file of collective agreements covering employees in these areas.

**Plans for 1971**

The Accident Prevention and Compensation Branch plans to continue the periodic safety inspection of work places and mechanical facilities and to generally expand accident prevention activities in the North.

Plans are under way to form Safety Councils at the principal locations in the North. These councils which will be comprised of representatives of federal departments and agencies will serve as self-interest coordinating bodies for federal accident prevention activities in the North.

## CANADIAN BROADCASTING CORPORATION

### NORTHERN SERVICE

#### Responsibilities

To provide a broadcasting service to meet the particular needs of the people living in the North — Indians, Eskimos, Métis and White — and give them a sense of identity with people living in the rest of Canada; and to inform the Canadian public about the North. The Northern Service meets these responsibilities by means of medium and shortwave radio and, to a limited extent, television.

#### Long-term Plans

The launching of Canada's domestic communications satellite ANIK in late 1972 will provide live network television service where there are ground receiving stations and television broadcasting stations. There will be 25 ground receiving stations in the initial phase; fourteen of them serving existing CBC Northern Service frontier coverage package television stations. However, it will not be possible to pick up the satellite signal on home receivers.

The Northern Service will continue to expand its radio network to unserved areas as the common carriers provide facilities: landline, VHF radio, microwave, tropospheric scatter and satellite.

Shortwave radio service to the North will be doubled in duration with the completion of CBC plans to build five 250-kw transmitters and an antenna system for the North at its shortwave station at Sackville, N.B.

### Review of 1970 Operations

#### Operations

On June 1st, CFGB, Happy Valley, Labrador and its LPRT network to Schefferville, Labrador City/Wabush and Churchill Falls became part of the Newfoundland Region. CFGB had been operated by the Northern Service for 11 years.

CHAK, Inuvik initiated an on-the-job office training program for local women students and gave operating and program instruction to prospective announcer/operators for

the community radio station which opened in January, 1971, at Tuktoyaktuk.

In August, 1970, a low-power relay transmitter was installed at Faro, Y.T. During the same month, CFFB, Frobisher Bay studios and offices were moved to new quarters in the commercial complex on Astro Hill.

Through the co-operation of the communications centre of the Department of Communications and of the Department of National Defence, the experimental UHF satellite mobile communications facilities of the NATO Tactical Satellite Communications I project were used for radio coverage of the royal visit in July to Frobisher Bay, Resolute, Inuvik and Yellowknife. Without these facilities, it would not have been possible to provide live radio coverage from these locations.

Today, nearly all communities in the Yukon and the Mackenzie have local transmitters broadcasting local and national programs, as do the communities in the northern area of the western provinces served by the Northern Service. Today, 13 communities North of Sixty receive television by means of frontier coverage package. With the exception of Frobisher Bay in the Eastern Arctic, there are at least 40 communities in the Northwest Territories still without local radio service, without television, and dependent on shortwave. There are about 40,000 people to be served in an area of over 15,000,000 square miles.

Apart from a private radio station and closed-circuit television at Whitehorse, CBC alone has the responsibility to provide a broadcasting service for the people of the North. Employing a staff of 85, the program service identifies itself with their needs and interests. A station manager is also program and technical director; an announcer/operator is also a writer, researcher, reporter, editor, commentator, host and producer; a technician performs many roles in his field. The only specialized program department in the Northern Service is *News* at Yellowknife and Whitehorse. Even so, every category of program is broadcast locally, with the exception of school broadcasts, and they may be forthcoming shortly. They must be done in the Indian and Eskimo languages as well as in English and French and must be regional and national as well as local if the public at large is to be informed about the North, its people and their concerns.

The broadcasting day is 19 hours — or longer if required. Not all national network programs are suited to Northern conditions: not all are broadcast. This increases the program responsibilities of local staff but at the same time improves the opportunities to provide local service.

While television has made a real impact on the communities receiving it, radio continues to be the vital medium of communications, and the service with which most people identify.

Broadcasting personal and public messages continues undiminished. These take various forms. Common to all stations are community announcements, ranging from good causes to serve to ways to enjoy good times. More remarkable are the personal messages exemplified by *Delta Roundup* broadcast three times daily by Station CHAK, Inuvik. Farther afield, messages are recorded by Indian and Eskimo patients in southern hospitals, such as the Charles Cammell at Edmonton, and broadcast on the Yukon and Mackenzie networks. Helping to keep hospital patients in touch with home are tape recording of programs in Indian and Eskimo produced at northern stations. Then, there are the messages, written on CBC message cards, by patients and students "outside" for broadcast to their families and friends back home. These are mailed to the closest radio station in the North for local broadcast. The cards are used also by people living in the isolated communities of the Eastern Arctic to keep in touch with each other by radio. They are incorporated in such programs as *Teterkat* produced and broadcast by station CFFB, Frobisher Bay, and *Uqausi* by station CHFC, Fort Churchill.

Tape recordings of these and other programs are flown to Montreal for further broadcast by shortwave. *Northern Messenger*, now a daily shortwave program, continues to feature messages in English and French from people in the South and around the world to relatives and friends in the Arctic.

*Weather* is no longer the simple matter it was in early broadcasting days. In addition to daily temperatures and wind strengths, weather forecasts for land, marine and air are now conditions, station CHFC was the only public agency continuing to operate.

In summer, a forest fire hazard index is broadcast by the Yukon and Mackenzie networks.

*Information* programming is in various languages on all northern stations. All originate local, regional or Territorial news daily. These news programs are similar to those carried elsewhere by CBC. A freelance news correspondent at Ottawa gathers and files news giving the Ottawa angle to stories of northern interest. Locally, the news editors write and record items gathered by staff and by correspondents in their area. There is an increasing interchange of news reporting between stations in the North and with national and regional newsrooms to the south. Yellowknife originates news in several Indian languages as well as in English. Frobisher Bay and Churchill prepare news programs in Eskimo. Daily news in Eskimo is included in the newscasts prepared at Montreal for the Northern shortwave service. In addition, the shortwave

service broadcasts a weekly review of territorial news prepared at Yellowknife.

Station CFFB, Frobisher Bay relays these and other news programs from the shortwave service although network connections are made to Frobisher Bay when special events warrant the great expense. When shortwave reception is bad, station CFGB, Happy Valley provides back-up news service by telephone to Frobisher Bay. All stations provide news coverage of special events as they happen — elections, the Yukon and N.W.T. council sessions, visits by important persons, Apollo flights to the moon, and emergencies. These special events are also broadcast in the Indian and Eskimo languages. Documentary news programs, such as *Directions '70* produced at Yellowknife, are broadcast by all stations.

*Documentaries* are largely undertaken as regional productions with contributions from all stations. Some titles in recent months were *How it's done Canadian style*, a documentary on the future of the Northwest Territories broadcast January 1, 1970, over a special network linking together the Mackenzie network, station CHFC, Fort Churchill, the Northern Shortwave Service and station CFFB, Frobisher Bay: *Co-ops in Action*, the successes and tribulations encountered in establishing local co-ops and forging links between them; *Travel Arctic*, a serious look at the tourist industry; *Getting the Oil Out*, the various alternatives for transporting northern oil to southern markets, more especially by submersibles.

*Open-line* programs, such as *Cross-talk* produced at Whitehorse and *Territorial Action Centre* at Yellowknife in the past winter reached out by telephone for comment by informed persons at Ottawa and elsewhere, as well as by local people in all the communities served by the Yukon and Mackenzie networks. The issue discussed may be local government, education, employment, the rights of the native people, the White Paper on taxation or pollution controls in the Arctic. The open-line program in Eskimo for women at Frobisher Bay, *Ananit*, is a sort of switchboard by which the participants can talk to each other on any topic.

*Youth Debates* was produced by Whitehorse and Churchill last winter (originally, a Canadian Centennial project of the Northern Service), between high school students in the Yukon, and between those in northern Manitoba. The debates took place, as remote broadcasts, before the public in the communities participating.

*Public affairs* are included in mid-morning and early evening programs broadcast locally; *A.M. Magazine* and *Kaleidoscope* on the Yukon network; *More than Music* and *The Territories Today* on the Mackenzie network; *Chronicle* on station CHAK, Inuvik; *The Morning Show* and *Tempo* on station CHFC, Fort Churchill; *Ullasui* and *Top of the Morning* on station CFFB, Frobisher Bay.

Local *Matinee* commentators broadcast daily on the Yukon and Mackenzie networks. Building up from such simple request-music programs as *Kooungyungafaksia* (Smile-awhile-time) at Inuvik or *Nfejawatit Ikaluinee* (Eskimo Hit Parade) at CFFB, Frobisher Bay, the program service in the Eskimo and Indian languages has expanded to cover a wide range of

information, interests and concerns. *Inoonoot Ookalleemagat* (Eskimo Magazine), in-depth reporting and interpretation at Frobisher Bay on Canadian and world events; *Klahowya* (Hello) by CFWH, Whitehorse, with probing reports on such subjects as unemployment and housing for Indian people in the Yukon; *Kondee* (News) by CFYK, Yellowknife, featuring health talks, job opportunities, and reports on efforts to create an organization uniting all the Indian people in the Mackenzie District.

*Community-action* programs are produced at Inuvik and Yellowknife in co-operation with the Indian-Eskimo Association of Canada. Expressly by and for native people, the programs consist of recorded statements putting forward their ideas and opinions on matters of interest and concern to them, in their own language or in English.

Although no longer responsible for the production of *Indian Magazine* since it became a national program in 1969 (the Northern Service launched it in 1964), northern stations continue to contribute and make local inserts into it.

To give the Kadluna (white man) a better appreciation of Eskimo life, there are the easy steps to learning conversational Eskimo, *Eskimo for Beginners*, produced at CHFC, Fort Churchill. On shortwave, the most important development has been *Nallachine* (Things to Listen To), a daily half hour in Eskimo produced in Montreal from material gathered throughout the North as well as in the south.

Daily programs for tourists are produced at Whitehorse and Yellowknife during the summer months. This summer, *Trails of '70* originates from all points of entry into the Yukon.

All the winter Carnivals, ranging from the *Sourdough Rendez-vous* at Whitehorse, to the *Caribou Carnival* at Yellowknife and *Toonik Tyme* at Frobisher Bay, receive full broadcast coverage.

This summer, of course, the major special events were the *Royal tour* of the Northwest Territories and the *Governor-general's tour* of the Yukon. The rash of summer conferences, including the Community Development Conference at Inuvik, the Communications Conference at Yellowknife, and the Northern Development Conference at Edmonton will be covered. Stealing the attention of most people in the Mackenzie and throughout the Territories was the Sir Alexander Mackenzie Canoe Race from Fort Providence to Inuvik with the official start given by HRH Prince Philip.

*Feature* programs produced in Montreal are broadcast by all stations. They are best exemplified by *Assignment North* and *Those Were the Days* to which all stations contribute. The former is a daily program on the Northern Service with a weekly edition on the National Service. The latter is available as a regional exchange program series and as a transcription issued by the CBC International Service.

All stations produce a daily program for children. A regional series *Stories of Indian and Eskimo* has been recently produced.

An important development in children's programming on the Mackenzie network is the new daily series *Who Am I?* where the language is Slave Indian.

*Youth* is served not only through popular music programs but also by such programs on the Mackenzie network as *The restless breed*, with youth participation in its production.

*Winds of Change*, a series produced by the regional production centre in Montreal for broadcast over the northern stations and shortwave, includes highlights from the lectures on Indian history and culture given by leading Indian authorities in the native studies program held during the year at Loyola College, Montreal. The native students taking part in the radio program, discuss the items which interest them most in the lectures and use these as a springboard to express related views. Occasionally programs in this series are broadcast by the national network. CFWH, Whitehorse, broadcasts a half-hour Phase II to this series each Thursday evening following the Montreal program (Phase I). The local Indian announcer/operator acts as moderator on the Phase II program, to which he has guests in the studio from the Yukon Native Brotherhood, residents of the local Indian community and Indian residents of the Yukon. They give their views and opinions on the topics discussed on Phase I.

Local choral concerts are featured on the Yukon and Mackenzie networks. These usually coincide with seasonal festivities of Christmas and Easter.

More popular are the live productions, usually undertaken in the winter months, with country-western and rock groups. Regional series of this kind have been produced at Whitehorse, Fort Churchill, Inuvik and Yellowknife. The major music project this past winter was CBC's *Search for Talent Contest* involving Inuvik, Churchill, Frobisher Bay and Yellowknife in selections throughout the Northwest Territories with the grand finale staged in Yellowknife. The latter was broadcast on a special network in the Territories as the culmination of a major N.W.T. Centennial project undertaken by the Northern Service.

Coverage of Centennial events and the production of special programs have taken much time this past year; the heaviest responsibility falling on Yellowknife with such events as the First Arctic Winter Games.

Northerners are sports-minded. In addition to regular bonspiels, hockey games, softball matches and so forth, either reported or given play-by-play common to all stations, the N.W.T. Centenary has produced The Top of the World Ski Meet and the Northern Games at Inuvik, and the N.W.T. Snowmobile Championships at Frobisher Bay. Northern short-wave listeners not only hear reports of such events but are kept up-to-date with daily summaries of national and international sports prepared in Montreal by the Northern Service. Special provision is made to provide northern listeners with broadcasts of selected western and interlocking football games.

*Religious broadcasting* is largely inspirational and pastoral. All denominations eligible to participate are invited to do so in daily *Thought for Today* programs and *Church Service* on Sundays. Churchill has experimented with a religious magazine

program in place of the church service in Eskimo and Indian as well as in English. Special broadcasts are made locally on the occasion of major church festivals.

One of the most important developments by the Northern Service has been in drama. All stations have produced dramas by local groups, usually performing from prepared scripts. Whitehorse presented some imaginative adaptations of Mark Twain's "Tom Sawyer" and "Huckleberry Finn". The breakthrough has been in the development of dramas in Eskimo and now in Indian.

Three drama series in Eskimo have now been produced at Povungnituk. A fourth, *Angutmarioyomayoq*, was produced in six quarter-hour episodes by Lizzie Aveeleeyook for broadcast during the late summer over CFFB, Frobisher Bay, CHFC, Fort Churchill and on the shortwave program *Nallachine*.

The precursor of this development was a series of 12 half-hour dramas dealing with the social ills of alcoholism and produced and broadcast at Frobisher Bay in 1961 within a month of station CFFB going on air for the first time. The latest development is at Yellowknife where a series of dramas in Slave were produced this summer by an organization known as "The Tree of Peace". The drama technique is proving so successful that it is hoped to expand production to more centres in the North.

#### Plans for 1971

##### Operations

A low-power relay transmitter station at Rae (Edzo), N.W.T. will be connected to the Mackenzie network.

Plans are being considered for the affiliation of the community radio station at Tuktoyaktuk, N.W.T.

Frontier coverage package television stations will be built at Faro, Y.T. and Frobisher Bay, N.W.T.

##### Programs

Plans include:

- the production of dramas by young Indian, Eskimo and Métis on subjects of interest and concern to them and their people;
- the inauguration of a northern shortwave service of informational programming to those listeners who understand only Cree and who live in the Hudson Bay area;
- improved and extended consumer information programs at each of the five CBC Northern Service program centres to meet local conditions affecting the quality of life of their communities;
- Phase II of the Native Studies program *Winds of Change* which the Northern Service produced in co-operation with Loyola College, Montreal in which Indian, Eskimo and Métis members of the community at each station will consider the topics discussed as they affect themselves;
- a weekly 15-minute children's program in English, *Adventures of Ookpik*, in which Ookpik the Arctic owl is caught up in adventures with northern friends as he and his Eskimo companion Anik explore all sorts of exciting situations familiar to the people of the North. The program series will also be distributed throughout the world via the CBC international transcription service;
- a humane and human treatment of the fur industry as seen by the trapper, costed by the furrier, worn by the consumer and sharply felt by such fur-bearing animals as the mink, the beaver and the muskrat. Prepared for national broadcast on the program "Between Ourselves" and entitled *All You Ever Wanted to Know About Fur and Were Afraid to Ask Your Friendly Neighbourhood Ecologist*, it contains such episodes as "The Northern Avenger" and "The Killer" which take the listener from trapline to fur salon;
- *Riverboat*, reminiscences of the Yukon waterways and the development of paddle-wheelers from their early operation as carriers of the men, the gold and the dreams of the Klondike, to their resting places along the Yukon riverbanks;
- *Illinniarniq* ("Things to Learn"), a series, not so much a structured learning program, as a living experience developed by the community of Povungnituk in Arctic Quebec. The series will be in 13 episodes and will be broadcast on the shortwave program *Nallachine* and locally over CFFB, Frobisher Bay, and CHFC, Fort Churchill, beginning January, 1971.

## CANADIAN NATIONAL RAILWAYS

### Responsibilities and Long-term Plans

Canadian National, as a commercial enterprise, is vitally interested in the development of a rational transportation and communication infrastructure in the North. Through the construction and operation of extensive northern transportation and telecommunication facilities over the last decade, CN has established the foundation for a comprehensive transportation network. This, coupled with experience in training indigenous people and in environmental control, represents the basis from which CN intends to expand and fully participate in the development of the Canadian North.

### Review of 1970 Operations

Canadian National, in 1970, continued to successfully operate the Alberta Resources Railway (under a lease agreement with the Alberta Government), the Sherridon-Lynn Lake line, and the Great Slave Lake rail line to Hay River and Pine Point.

Canadian National telecommunications facilities and services were expanded with an increase in capacity of the Hay River-Yellowknife microwave system, the initial construction of a combined microwave and tropospheric scatterwave system between Whitehorse and Tuktoyaktuk, and the expansion of telephone services in the Yukon and Northwest Territories.

### Plans for 1971

Canadian National has undertaken a long-range evaluation of transportation requirements in northern Canada to serve as a framework for strategic action. A comprehensive study of supply and demand for the natural resources of the North, along with a catalogue of location, extent, and size of proven and probable mineral deposits will be developed, and the magnitude of traffic flows predicted. Based on these studies, possible routes for handling the traffic will be determined, and the mode, or combination of modes, best suited to handle the traffic flows will be identified.

During 1971, CN expects to continue its participation in various northern transportation studies. In particular, CN has agreed to jointly finance, with Alberta Gas Trunk Line

Company Ltd., a study of the economic and technical feasibility of a pipeline to carry natural gas from Alaska through the Northwest Territories and Yukon to markets in Canada and the United States. The study will include an assessment of the ability of highway, rail, water (barge), air, and the newer modes of transport to provide support during the construction of the gas pipeline by moving the necessary materials. The modes will also be evaluated in the light of the longer-term needs for transportation in the Mackenzie valley.

## CANADIAN TRANSPORT COMMISSION

### AIR TRANSPORT COMMITTEE

#### Responsibilities

The licensing of air carriers to operate commercial air services; the economic regulation of air carriers; investigations and surveys relating to the operation and development of commercial air services in Canada and advising the Minister of Transport on matters relating to civil aviation.

#### Long-term plans

Normal planning to meet responsibilities.

#### Review of 1970 Operations

Contracts were awarded to the following carriers for the period July 1, 1970 to June 30, 1971:

DEWLine Vertical	— Transair Ltd.
DEWLine Lateral	— Nordair Ltd.
Gap Pine SAC	— Wheeler-Northland Airways Ltd.
Gap Pine ADC	— Eastern Provincial Airways (1963) Ltd.

Supervision and coordination of these contractual arrangements continue.

The Committee held an important Public Hearing on a number of applications for charter licences using large aircraft to serve the western Arctic. As a result of this Hearing, increased authority was granted to International Jet Air Limited, Northwest Territorial Airways Ltd. and Wardair (Canada) Limited.

#### Plans for 1971

Normal planning to meet responsibilities.

## CENTRAL MORTGAGE AND HOUSING CORPORATION

### Responsibilities

Design of housing, preparation of town development plans, and drafting of planning legislation as requested from time to time by the Department of Indian Affairs and Northern Development.

Financing of housing under the terms of the National Housing Act.

### Long-term Plans

The facilities provided under the National Housing Act and the services of the Corporation will be made available wherever and whenever they are required.

### Review of 1970 Operations

#### Lending Activities

A total of 506 new housing units were financed under the National Housing Act compared with 216 in 1969. Of these, 181 units were in the Yukon and 325 in the Northwest Territories. The lenders provided three loans for three units in the Yukon and seven loans for 259 units in the Northwest Territories. Central Mortgage and Housing Corporation financed 178 units in the Yukon and 66 units in the Northwest Territories.

In addition, Central Mortgage and Housing Corporation provided funds for the construction of a 20-unit low-income family housing development at Pine Point and a 29-bed hostel at Inuvik.

The second-mortgage plan provided by the governments of the Yukon Territories and the Northwest Territories, as an addition to the loans available under the National Housing Act, continued in operation. Central Mortgage and Housing Corporation administers the plan on behalf of the Territorial governments and made five such loans during 1970 in the Northwest Territories and 25 loans in the Yukon. This brought the total number of second mortgage loans to 98 since inception of the program in 1962.

### Partnership Activities – Yellowknife

#### *Land Assembly*

Two land assembly projects have been undertaken in the Town of Yellowknife. The first project, consisting of 67 residential lots and a four-acre multiple housing site is situated southwest of the existing built-up area and is known as the 57th Street project. In this project, 48 single-family dwellings and 24 multiple-housing units have been constructed for employees of the Northwest Territories Government. The financing of most of the dwellings is by NHA loans. All but two lots have been sold.

The second land assembly project, situated east of the Town in an area known as the "School Draw" consists of 142 residential lots and three multiple-housing sites. While arrangements were made to dispose of some of the lots in 1968, the official sales program commenced in November, 1969. Sixty-eight lots have been sold.

#### *Public Housing – Senior Citizens*

In the spring of 1969, tenders were called and a contract was awarded for a project to house elderly persons on a site adjacent to the old St. Patrick's School at 52nd Street and 52nd Avenue. The building design, which provided for 17 bachelor units with a common lounge, was prepared by Central Mortgage and Housing Corporation. The suites were completed and ready to be handed over in early January, 1970.

#### *Public Housing – Low-Income Families*

In September 1969, a contract was awarded for a project of 20 three-bedroom and four four-bedroom back-to-back housing units for rental to families of low income. The building design was prepared by Central Mortgage and Housing Corporation. The units in this project were handed over to the Housing Authority in December 1970.

A study is under way for another public housing project of approximately 36 units for families of low-income.

**Partnership Activities – Hay River***Land Assembly*

A study of a land-assembly project of about 82 lots is under way.

**Partnership Activities – Fort Smith***Public Housing – Senior Citizens*

In August, 1970, a contract was awarded for a senior citizens project to consist of six bachelor and two one-bedroom units. The estimated date of completion is July, 1971.

*Public Housing – Low-Income Families*

In September, 1970, order-in-council approval was received for the construction of 12 three-bedroom and eight four-bedroom semi-detached units for families of low-income. It was intended that a call for tenders would be made and a contract awarded in May, 1971.

**Partnership Activities – Inuvik***Public Housing – Low-Income Families*

In 1969, tenders were called for a 36-unit three-bedroom project for families of low-income. This project, which was designed by Central Mortgage and Housing Corporation, will consist of five two-storey blocks built on wooden piles and will be serviced by the existing utilidor system. The contract was awarded in November, 1969 and the project will be completed and handed over in early 1971. A second project is under study in the area.

**Research Grants and Studies Under Part V, NHA, 1954**

The Corporation continued its support of a program of research being carried out by the Centre for Settlement Studies, University of Manitoba on the problems of settlements which have been developed on Canada's northern frontier as a result of resource development.

**Plans for 1971**

Approved projects and studies will go ahead, as requested by the Territorial governments.

The following proposals are presently under discussion:

<b>Location</b>	<b>Size</b>
Yellowknife	24 family units
Hay River	10 family units
	10 senior citizens units
Inuvik	10 senior citizens units
Fort Simpson	7 senior citizens units
Fort McPherson	7 senior citizens units

## **CROWN ASSETS DISPOSAL CORPORATION**

### **Responsibilities**

To be responsible for the sale of surplus assets reported by government departments and agencies operating in the north and also, under a long-standing agreement with the United States Government, to conduct the sale of their surplus property located at DEW Line sites and other northern establishments.

### **Long-term Plans**

The Corporation will continue to coordinate and provide a sales and liaison service to federal government departments and to United States governments agencies, with respect to the sale of their surplus assets located in the north.

### **Review of 1970 Operations**

Special sales were conducted during the summer and autumn at Whitehorse, Churchill, and Goose Bay. The U.S. surplus property located at DEW Line Stations was sold to individuals or organizations operating in the area.

### **Plans for 1971**

The Corporation will conduct normal sales operations and be ready to assist in any special disposal problems that may arise at Canadian or U.S. establishments.

## DEPARTMENT OF AGRICULTURE

### Responsibilities

To evaluate the physical and economic potential for agriculture in northern Canada; advise other government agencies on matters related to agriculture in the North; study the biology, distribution, and systematics of northern insects, plants and soils.

### Long-term Plans

To continue the Northern Agricultural Research Group headquartered at Beaverlodge with an Experimental Farm at Fort Vermilion and off-station work at other locations as required; continue soil surveys and botanical and entomological collections; study agro-climatic relationships; provide agricultural data as required by other government agencies.

### Review of 1970 Operations

*Agricultural research* on the Experimental Farms at Mile 1019, Alaska Highway, and at Fort Simpson, N.W.T., was discontinued as forecast in last year's report.

Native vegetation has produced 1,400 lb/acre dry matter (3-year average) on Talston soil in the Slave River Lowlands. At Grand Detour, yields have been slightly less. The application of 200 lb. N per acre doubles production. Using a brome-grass alfalfa mix and 300 lb. N plus 200 lb. P per acre it was found that 6,000 lb. of dry matter per acre could be harvested.

A number of grass and legume varieties have shown promise for use in the area. There is some preliminary evidence that certain types of soil gradually become salinized when cultivated. Thus, before any large-scale land breaking schemes are envisioned, further investigation of salinization in these soils is essential.

### Plans for 1971

The exploratory research on the Slave River Lowlands will continue. Up until now, no livestock have been used in assessing forages. Either during 1971 or 1972 livestock will be introduced into the program in order that a true assessment of the forage potential can be obtained.

A soil surveyor (land classification) from the Alberta Soil Survey Team will join the interdisciplinary-interdepartmental team examining the Mackenzie River Basin. This is expected to take six weeks during July and August.

## DEPARTMENT OF COMMUNICATIONS

### Responsibilities

The Department of Communications was established to foster the orderly development and operation of communications for Canada in the domestic and international spheres. This includes:

the stimulation, development and introduction of new communications systems, facilities and resources; the extension of telecommunications systems and services to obtain optimum benefits for Canada in the short and long term; the protection and sustenance of Canadian interest in international telecommunication systems, services and undertakings; and the availability of the radio-frequency spectrum to permit the orderly development and growth of radio communications.

The North is an area to which the Department is devoting particular attention by studying the needs for telecommunications services, by researching systems to meet those needs and by coordinating, regulating and fostering their implementation. Public systems are constructed and operated by commercial communications companies. Private systems are established also to meet the special needs of their owners.

### Long-term Plans

The aim of the Department is to have communications frontiers extended northward so that the quality of service may be equivalent to that enjoyed in southern Canada. Research will be undertaken to determine optimum technical solutions. Programs involving public and private investment will be encouraged and arranged.

The program for the launching of the Canadian Domestic Satellite System by Telesat Canada is on schedule. The ANIK satellite will be operational on January 1, 1973, and system planning is proceeding to ensure that the telecommunications coverage in the North is as extensive as possible. It is intended to have two large stations for telecommunications and television services at Frobisher Bay and Resolute; and 25 stations for the reception of television in the North. Consideration is being given to have operational, in the summer of

1973, a number of relatively low-cost earth receiving stations for a thin route northern service to remote communities. Prime attention is being given to the use of the earth stations having the capacity of receiving and transmitting on two telephone channels. The system design also takes into account the need to provide one radio program circuit to enable the northern network of the CBC to be extended to small communities inaccessible by terrestrial means.

A Memorandum of Understanding has been signed between the Department of Communications and National Aeronautics and Space Administration for the launching of an experimental communications technology satellite in 1974. Experiments will be conducted over a two-year period and some will have special importance to the North. By using a satellite with a high effective radiated power, it will be possible to communicate with very small stations in remote communities with telephone, radio, and television signals. The stations working into the new experimental satellite will use antenna diameters of 3 to 8 feet. Antenna sizes of this order permit inexpensive transportable stations to be designed to serve the smallest communities with the full range of telecommunications services. Direct broadcasting to community antenna systems or, alternatively, to individual homes in small communities would achieve the ideal of live television coverage to all of the Canadian population. Another study is being pursued with the Post Office on the feasibility of transmitting mail electronically, which if included in future satellite communication systems, could contribute to the improvement of northern communications.

Some interesting possibilities are being explored to respond to the desire for local broadcasting by northern residents in smaller communities. An attempt is being made to garner support for the implementation of a small experimental broadcasting station in a remote community. There is also a possibility that cooperation between the Government of the Northwest Territories and this Department may lead to an inter-community HF network to provide a means for northern residents to communicate on their own radio system. Another area being explored is the dissemination of information among communities using Video Tape Recording techniques.

### Review of 1970 Operations

A Northern Communications Conference was held in Yellowknife, N.W.T., between September 9 and 11, 1970. The Conference provided an excellent opportunity for the people of the North to be heard on a variety of communication topics and issues. It enabled them to express their views and present their needs for improved communication services. About 200 people attended the Conference. It was intended that the Conference should focus attention publicly on the relevance of communications to northern needs and aspirations. The multi-disciplinary blend of southern experts and their interaction with the residents of the North served to produce recommendations that were both imaginative and pragmatic. Some of the more important recommendations of the Yellowknife Conference are summarized in the Annex.

The Department of Communications continued to provide financial support to Canadian National Telecommunications for an amount of \$220,000 for the operation of the Mackenzie River Pole Line System. Improvements in service are planned at Hay River and Inuvik, and to all intermediate communities between these centres in the Mackenzie River Valley.

Canadian National Telecommunications installed this year a \$2 million radio relay and tropospheric scatter system between Whitehorse and Inuvik. This is a major project and when fully operational will respond to the pressing demand for telephone and data services that has developed due to intense oil activity in the Mackenzie Valley. On a smaller scale, the company has installed a new 25-line exchange at Churchill Copper in the Yukon, while exchanges have been expanded at Fort Providence, Fort Simpson, Fort Smith, and Inuvik, N.W.T.; and at Carcross, Whitehorse, Faro, Porter Creek, and Watson Lake, Yukon.

In the Eastern Arctic, the Department of Communications continues to operate a tropospheric scatter terminal to provide telecommunication services at Frobisher Bay to southern centres.

Bell Canada installed during 1970 two public toll stations, one at Port Burwell for communications to Frobisher Bay, and the other at Belcher Islands for communication to Alma, Québec.

### Plans for 1971

This Department plans to establish a Telecommunications Regulations Office at Yellowknife, N.W.T., towards the end of the year. This office will bring a departmental presence to the North and assist the Government of the Northwest Territories and northern residents in the development of radio services. It will handle matters such as radio licensing and interference elimination.

Canadian National Telecommunications plans to expand its exchanges at Aklavik, Fort McPherson, Tuktoyaktuk, Yellowknife, Whitehorse, and Watson Lake. Mobile base stations will be installed in the communities of Arctic Red River, Fort Good Hope, Fort McPherson, Parsons, Rat Pass Mountain, Faro, and Ferry.

Bell Canada intends to open new HF public toll stations at Broughton Island, Hall Beach, Lake Harbour, Clyde River, and Grise Fiord.

### ANNEX

This Annex contains the main recommendations of the Communications Conference held at Yellowknife, N.W.T., between September 9 and 11, 1970. These recommendations were developed spontaneously in the Conference and they should not be taken as a Department position on the issues discussed.

"There is an urgent requirement to provide reliable two-way telephone and teletype services to remote communities in the Territories and northern parts of the Provinces. The prime need is for telecommunication facilities to support essential health and emergency services. Priority must be given to establishing telecommunication links between remote communities and centres where hospitals are located, e.g. Frobisher Bay. The northern residents want good facilities for:

- intra-regional communications
- inter-regional communications
- local exchange connections

This reliable service should be available on a 7-day 24-hour basis to permanent communities having populations greater than 25 or 50 and should not be subject to outages due to climatic or other natural variations. Reliable telephone and teletype services are also required by Territorial and Provincial Governments and by federal agencies for administration purposes. A teletype circuit is essential for administration when the community has more than 300 people. More sophisticated services (medium and high speed data) should be provided where demand is indicated by commercial agencies.

The situation generally is that existing point-to-point services are inadequate and that problems are particularly acute in the District of Keewatin, Baffin Island, and the Arctic Coast. High Frequency (HF) radio as presently operated does not meet required levels of service.

Radio broadcasting is very important to northern residents. Presently there are large areas, such as the District of Keewatin, without broadcast services. Each community should have a radio program service for education, information, entertainment, and social action purposes. This service might be established by low-power community-operated radio stations. Programming in native languages should be encouraged. Full participation and operation by local people is recommended. Community ownership — as distinct from CBC overlap — should be investigated. Consideration should also be given to higher-powered AM

broadcasting stations to serve complete regions. Relaxation of regulations and technical standards to permit the use or development of low-cost equipment should be encouraged if this does not interfere with public safety and convenience. The stations at Churchill and Inuvik provide a service that could be used as precedent for other areas.

Low-Power community broadcast stations should be connected intra-regionally, inter-regionally, and to the national radio CBC network. Northern orientation of programming is essential. Radio network service is presently unavailable in the Central and Eastern Arctic and along the Arctic Coast. The CBC short wave service is unreliable and subject to long outages due to fading. Steps to improve this service should be taken. Radio coverage should be available to everyone as the essential means of mass communication in the North. The CBC Northern Service should be established in the North (perhaps at Yellowknife) and be given full program control including choice of what it wants from the national network.

Nomadic or hunting groups should be provided with low-cost radio units to contact their resident community in emergency or other urgent situations. Special equipment may have to be developed for the purpose and have incorporated a homing device in addition to voice capability. A task force of technologists and users should be formed as soon as possible to pursue this concept. The equipment should be inexpensive, portable, and rugged for Arctic conditions.

More extensive use should be made of technology for educational and social development purposes. Services such as video tape recorders (vtr), films, sound cassettes, and records are flexible and economical. Video tape recorders are particularly valuable and should be widely distributed for local use. They can be used effectively for group-interaction discussions and for recording community news and events for subsequent presentation to government legislators and staff. Video tapes can be exchanged between communities for regional dissemination of news and affairs. Regular air lifts of video and audio tapes should be considered. Each community should have trained personnel for the necessary maintenance of equipment. Primary power sources within communities are required. Video tape recorders might be installed in isolated communities as part of a pilot study to aid in establishing program requirements for regular TV service.

Live Television and Frontier Package Coverage service should be extended to more communities in the North with programming suited to the northern needs. This may mean an additional channel on ANIK to ensure:

- that the transmission medium exists for carrying northern network programming;
- the feasibility of programming originating in the North (possibly Yellowknife) can be developed. It is recognized also that the availability of live television could stimulate industrial initiatives.

Concern is expressed by native people that programming designed for southern audiences would distract and disturb their culture. It would also widen the generation gap between the older traditional groups and the younger people who have been exposed to the southern way of life.

There was interest expressed in direct broadcasting to home receivers and the advantages of the technique in education. Research should be actively pursued to realize the potential of satellite communications for this purpose.

The common carriers should give adequate preventive maintenance service on a routine basis. A long-range training program should be given to northern operators so that they can become permanent maintenance men in the North; interest in amateur radio clubs should be fostered.

A pool of portable equipment should be made available in every settlement to be leased or loaned to all trappers and others who are leaving the settlement and are going on traplines, to permanent camps, oil sites, etc.

An inventory should be compiled of radio frequencies in use, systems, equipment, and purpose in northern Canada so that services can be optimized and duplication eliminated.

The postal services in the North are too slow and deliveries proceed by extremely indirect routes. This service is very important to residents and improvements are required.

Attention should be given to communication at the inter-personnel level. This means direct communication between white and native people. Sensitivity training can help close the gap between the "haves" and the "have nots".

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

## EARTH PHYSICS BRANCH

*Geomagnetic Division***Responsibilities**

The Division measures and charts the magnetic field, operates a network of magnetic observatories, and conducts research into the structure of the upper atmosphere and solid earth by geomagnetic methods.

**Long-term Plans**

It is planned to reoccupy magnetic repeat stations at 3- to 5-year intervals, to conduct three-component airborne magnetic surveys at 5- to 10-year intervals, and to operate permanent and temporary magnetic observatories.

**Review of 1970 Operations**

Twenty magnetic stations were reoccupied in the Western Arctic to determine the secular variations in the earth's magnetic field. A three-component airborne magnetic survey with flight lines 40 miles apart, covering the Arctic Archipelago, Northern Greenland, and the Arctic area to the Pole, was made in late 1970. The total distance flown was 50,000 nautical miles at an altitude of 10,000 feet. Recordings of time variation of the magnetic field in three components were obtained at Castel Bay and Sachs Harbour on Banks Island, at Cambridge Bay and Holman on Victoria Island, and at Coppermine and Yellowknife. These observations are intended to assist in the definition of the southern extension of the Mould Bay conductivity anomaly. Paleomagnetic collections were made on Victoria Island and in the regions of Great Bear and Great Slave Lake.

**Plans for 1971**

Twelve magnetic stations will be reoccupied on the Alaska Highway as part of the program for determining secular variation. The six permanent Arctic magnetic stations will continue in operation, and temporary magnetic recording stations will be operated at Cambridge Bay and on the ice of the Lincoln Sea north of Ellesmere Island.

*Gravity Division***Responsibilities**

The Division conducts gravity surveys throughout the Canadian north, including the water-covered regions. This work is carried out in cooperation with the Polar Continental Shelf Project. Gravity surveys provide basic data for the exploration industry and for studies of crustal and upper mantle structure; in addition, these surveys are used to establish a first order gravity network to serve as reference and control points for all regional and detailed surveys.

**Long-term Plans**

The main objectives of the Gravity program are to determine the gravity field at intervals of 15 km or less over the land-and water-(or ice-) covered regions of northern Canada, to develop and improve methods of measuring gravity under unstable conditions such as over ice-covered regions, and to study long- and short-term vertical and horizontal movements of the Arctic Sea ice. The Gravity Division plans to continue using gravity and other data for studies of:

- the structure of the crust and upper mantle,
- isostasy and vertical movements of the crust,
- geodesy.

**Review of 1970 Operations**

Establishment of the first-order network of gravity stations was continued in 1970 with a pendulum tie between Ottawa and Resolute Bay.

The Gravity Division mounted a major regional gravity survey in the District of Keewatin and in the Beaufort Sea. The former survey covered the area between 60° north and 66° north, and from the shoreline of Hudson Bay to a longitude 102° west. There were 3,500 gravity stations established in this area. The survey in the Beaufort Sea, which was done with the cooperation of the Polar Continental Shelf Project, covered 50,000 square miles and produced 1,500 observations.

Observations of ocean tilt in the Arctic Ocean, reported in 1969, were discontinued in 1970 to permit the reduction of data and the development of new instruments.

#### Plans for 1971

Gravity surveys during 1971 will complete work in the District of Keewatin from Hudson Bay to longitude 102° west and from latitude 60° north to the coast. The survey of the Beaufort Sea west of and including Banks Island will be continued.

#### *Division of Seismology*

##### Responsibilities

The Division operates seismic observatories at Alert, Mould Bay, Resolute, Frobisher, Inuvik, Yellowknife, Baker Lake, Churchill, Great Whale River, Schefferville, and a large seismic array near Yellowknife. The seismicity of the Arctic is studied; in addition, research is conducted on earthquakes in other parts of the world as recorded in the Canadian north. In cooperation with the Polar Continental Shelf Project, crustal seismic refraction studies are undertaken. Geothermal research is also carried out through the Canadian north.

##### Long-term Plans

It is planned to improve the coverage of local earthquakes in the Yukon by the installation of a second-order seismic station at Whitehorse. The Division intends to continue its studies of the crust and upper mantle in the Canadian north, and to continue geothermal research from the ice, in lakes and in boreholes abandoned by oil companies and drilled for the Pan-Arctic Project. The seismic array at Yellowknife will be modernized, and its long-period capability slowly increased by the addition of radio-linked out-stations.

#### Review of 1970 Operations

The seismic stations listed above operated continually, as did the seismic array. Equipment was modernized at a number of stations, including the array.

Geothermal measurements were made in the Sverdrup Basin and the Mackenzie Valley. Development has begun of field instruments to be used in the studies of thermal transfer in the active permafrost layer of the Mackenzie Valley.

Studies have begun of the earth crust in the Baffin Bay area in the hope of obtaining a better understanding of the tectonic processes of the region.

#### Plans for 1971

The seismological observatory program will be continued. A program of updating instrumentation at Yellowknife will accelerate this year. Geothermal research is planned on a continuing basis in the N.W.T. and the Yukon.

#### Energy Development Sector Responsibilities

The Energy Development Sector is responsible for coordinating, promoting and recommending national policies and programs with respect to energy. Its mandate entails studies and reviews on all aspects of energy development, transportation and use. It is concerned with such matters as resource appraisals, energy resources available for exports, regional development associated with energy, energy transportation and transmission, foreign ownership policies, government participation in energy resource development, financial assistance to energy resource development, energy resource research, environmental problems posed by the development and use of energy, and the outlook for new energy sources.

#### GEOLOGICAL SURVEY OF CANADA

##### Responsibilities

The Geological Survey of Canada surveys, describes and interprets the geology of Canada and associated mineral deposits of economic interest and maintains teams of experts in the earth sciences and supporting disciplines to carry out these tasks, to conduct related research and development and to provide geoscientific advice and support to federal agencies. It also provides geologically-based information on land resources and terrain performance designed to assist in effective use and conservation of resources and in the management and preservation of man's environment throughout Canada.

##### Long-term Plans

The reconnaissance phase of the national geological mapping service (mainly mapping at the 1:250,000 and 1:500,000 scales) is planned for completion in 1976 and it is expected that in many parts of Canada a more sophisticated stage of the inventory can be achieved in the next 25 years. At that time, a national geological inventory on a scale of 1:250,000 and extending in depth to 20,000 feet (the present maximum depth for economic exploitation of mineral resources) should be available.

The relatively high dependency—which increases northward to total dependency in the high Arctic—of the Canadian economy and land development on mineral resources, entails the provision of more geoscientific information to outline potential ground for mineral exploration. The likelihood of greatly expanded economic activities in the North greatly increases the need for geological inventory data on terrain and unconsolidated deposits. During the past two years, the Geological Survey has placed high priority on increasing its activities relating to terrain inventory and terrain performance in northern federal lands, particularly in areas of petroleum activity.

In support of some of these requirements, basin analysis studies will be carried out in various parts of the Interior Plains and Arctic Lowlands to elucidate and interpret the economic, tectonic and historical significance of the stratigraphy and sedimentology of the rocks of these areas and to determine the relationships of this stratigraphy to that of the Mackenzie River Delta, and the Continental Shelf. These studies will

involve paleontologists, stratigraphers, petroleum geologists, and structural geologists among others.

As part of the national mapping service and in support of the mineral inventory and forecasting activity, numerous studies will be carried out in the Precambrian rocks of the Bear-Slave province (an area extending roughly from Great Slave Lake to east of Great Bear Lake). In addition to bedrock mapping, geochemical and geophysical studies will be made, the known mineral deposits studied and geomathematical techniques applied to currently available data to predict areas of potential economic importance.

Concern by government over terrain sensitivity throughout the north relative to the application of new land use regulations requires the Geological Survey to expand its studies in this field. Government requires information on terrain as background for construction engineering, land-use planning and conservation of the environment. The increasing exploration activity in the shallow water areas off the mouth of the Mackenzie calls for terrain studies to be extended in order to provide information relative to planning and regulation of engineering aspects of petroleum activities in this and similar areas. Present and anticipated mineral and engineering development and the requirements for forestry and environmental management throughout the northern forest zone indicate the need in the near future for greatly increased terrain information.

Aeromagnetic mapping coverage at the scale of 1 inch to 1 mile to explore the geology at depth and beneath overburden is planned for completion in 1980 or earlier. This work is performed under contract by industry.

### Review of 1970 Operations

About 34 field projects, including aeromagnetic surveys done under contract, were carried out in the Canadian North in 1970. Seven of these were in Yukon Territory, the other 27 in the three districts of the Northwest Territories. Preliminary results from most of these studies were published January 8, 1971 in the Geological Survey's "Report of Activities, April to October, 1970" (Geol. Surv. Can. Paper 71-1, Pt. A, 259pp.).

Regional mapping on a scale of 1:250,000 was completed in central Yukon Territory and another party made a geochemical study of 74 intrusive, acidic plutons north of Tintina Trench. Preliminary results of this study will be made available to the public before the 1971 prospecting season and will be of direct benefit to those engaged in mineral exploration.

A reconnaissance of the Snag area was begun; this will be continued with helicopter support in 1971.

A study of the surficial deposits of Herschel Island was made in order to assist in land utilization studies by other agencies.

As part of a Canada-wide study of lead-zinc deposits the Tom Group claims (NTS 105 0/1) were examined.

Three officers undertook related studies of Mesozoic rocks in northern Yukon and northwestern District of Mackenzie.

These included paleontological, structural and stratigraphic investigations.

The last, large, geologically unmapped part of Canada, central Baffin Island (an area of about 54,000 square miles) was mapped with helicopter support. No significant mineral occurrences were found although lead-iron formation was seen in several places.

Aircraft support was also used in the study of Prince of Wales Island. About 570 landings using a Piper Super Cub were made. The data obtained will aid in petroleum exploration being undertaken in this area.

Detailed studies of lower Paleozoic clastic units were made at three locations in northern Ellesmere Island. This work provided data useful in elucidating the history of the sedimentary basins of the northern Arctic Archipelago and is thus of direct value to petroleum exploration activities.

Studies on the glacial geology and geomorphology of southern Ellesmere, Coburg, and Devon Islands were continued.

Officers of the Survey participated in Phase 8 of the Hudson 70 cruise. Sediment studies were made of the Beaufort Sea between 69° and 72°N and 128° and 141°W. In addition, about 1,200 miles of shallow-water seismic profiling was carried out which has made possible an interpretation of the subsurface.

In order to provide areal and stratigraphic information applicable to permafrost and engineering studies and petroleum development, a study of the Quaternary deposits and landforms of NTS map-sheets 97 F, 107 C, 107 D and 107 E was undertaken.

Studies of erosion in a permafrost environment were continued at the site of the 1968 Inuvik forest fire.

The examination of geomorphic processes in the Mackenzie Valley and along the Arctic Coast was continued. Features such as permafrost, pingos, ground ice and coastal retreat were studied as was the mixing of the Liard-Mackenzie and Great Bear-Mackenzie Rivers water.

Operation Norman, begun in 1968 and designed to complete the reconnaissance mapping of parts of NTS 86, 87, 96, 97, 106, 107, to conduct stratigraphic and structural studies, and to evaluate the economic potential of the area was completed.

Studies designed to develop regional geochemical exploration techniques in zones of continuous permafrost were continued in 1970 in the Coppermine area. The techniques and results are fully described in Geol. Surv. Can. Paper 71-1, Pt. A, pp. 61-67. It appears that the method can be used as a prospecting tool in other areas of basic volcanic rocks in the Arctic.

To determine the effectiveness of regional geochemical methods, particularly hydrogeochemistry in determining large anomalous areas, a pilot study was made near Kaminak Lake. In the same area another officer began an esker and till sampling program to determine the dispersion pattern of rock, mineral and chemical components of eskers and tills relative to their bedrock source. Such knowledge will be useful in

delineating geological boundaries masked by surficial cover and in the search for mineral deposits.

A stratigraphic and metallogenetic study of the Kaminak Group of Archean-age rocks was begun. The stratigraphy and tectonics of these rocks appear analogous to similar volcanic-sedimentary complexes in Ontario, Quebec and Manitoba and it would appear that it is not impossible that major ore fields similar to those found in more southern parts of Canada exist.

A study of the stratigraphy and structure of Aphebian sedimentary rocks in Neultin Lake and Edehon Lake area was continued to establish the extent and characteristics of the original basins of deposition and thus assess their potential for mineral occurrences, and to study the petrology and mineral potential of post-kinematic fluorite-bearing prophyritic rocks.

Mapping of the Yellowknife map-area for publication at 1:250,000 was begun and to the south of Great Slave Lake a study of the sedimentology and stratigraphy of the Nonacho Group was completed.

A study of the stratigraphy and structure of the Epworth Fold Belt south of Coronation Gulf designed to update a reconnaissance map published in 1960 was continued.

A sedimentological and stratigraphic study of the Hornby Bay and Coppermine River Groups was continued. This study is designed to assess possible correlations with similar rocks elsewhere in the Canadian Shield.

A study of the anorthosite-gabbro-gneiss-granulite Daly Bay Complex, north of Chesterfield Inlet, was started in 1970 in order to provide an understanding of the origin, age, and stratigraphic relationships within the complex as well as to the surrounding gneisses.

Using CCGS *Labrador* as a base and the ship's helicopter for traversing, the reconnaissance mapping of Coats, Walrus and Bencus Islands was completed.

The Bankeno Mines property on Little Cornwallis Island and the Texas Gulf Sulphur Company deposit near Arctic Bay were studied briefly as part of a study of lead-zinc deposits.

The cross-country gamma-spectrometric profile flown in 1969 between Ottawa and Yellowknife disclosed that the area between Fort Smith and the East Arm of Great Slave Lake was of special interest. Ground studies were made in 1970 on three of the most interesting anomalies.

During 1970 aeromagnetic surveys were continued, 35,000 square miles of survey being completed in the Dubawnt Lake area and 11,000 line miles flown in central Baffin Island.

*Appendix A* lists items published by the Geological Survey in 1970 dealing with the Northwest Territories and the Yukon Territory.

#### Plans for 1971\*

Active scientific projects concerned with the Northwest Territories and Yukon Territory total about 143 of which 98 are concerned with the Northwest Territories, 20 with the Yukon Territory and 25 with both. However, many of these projects involve only laboratory and office work as they represent the report-writing stage based on field data collected

during earlier field work. Of the 143 projects, 82 have a field component and of these 57 are expected to carry out field work in the Northwest Territories, 12 in the Yukon Territory and 13 in both. Included in these figures are aeromagnetic surveys which will be carried out under contract in all districts of the Northwest Territories.

*Appendix B* describes the planned scientific program for the Northwest Territories; those projects which are expected to involve a field component in 1971 are indicated by an asterisk.

*Appendix C* presents similar data for the Yukon Territory.

Basin analyses will be carried out in part of the Interior Plains and the Arctic Lowlands. These are designed to obtain and maintain from all available sources optimum three-dimensional knowledge of the geological features of each area (basin) as a means of guiding exploration planning, administration and regulation.

A major geological study of the Bear-Slave province is planned. It will include up-dating some reconnaissance maps made in the 1930s (e.g. work was started in NTS map-sheets 85 I, J in 1970), a geochemical reconnaissance of the area for which preliminary work is planned for 1971, a study of the metallogenesis and mineral potential of the region to be initiated in 1971, and additional aeromagnetic work.

Several parties will be carrying out field investigations as part of the Mackenzie Valley Transportation Corridor Study. Studies will be made of the environmental geology of northern settlements, the application of geophysical techniques to the determination of thickness of permafrost, the amount and type of ground ice in relation to surficial materials, and the determination of *in situ* parameters relative to engineering properties of surficial materials, and the surficial geology and land classification of the area. These studies will be concentrated in the Mackenzie Delta area and will form part of the Geological Survey's inventory of information on terrain and surficial deposits.

The District of Keewatin and Melville Peninsula will continue to be an area of continuing interest. The general structure and historical and economic geology of the presently unmapped northern part of Melville Peninsula will be studied, a study of the metallogenesis and mineral potential of the area will be made and in southern Melville Peninsula an examination of the Penrhyn Group metamorphic rocks described in the Review of 1970 operations will be continued as will the mineral indicator tracing studies.

Aeromagnetic surveys will be continued with most work being centred in NTS map-areas 26 J, K, N, O, 27 A, B (southern Baffin Island) 55 M, N, 66 A-D (Thelon River) and 86 M-P (Coppermine area).

In Yukon Territory, Operation Snag-Yukon, designed to provide information on the age, sequence, structure etc. of the bedrock formations and on their economic potential, will be continued. In conjunction with basin analysis studies conducted in the Beaufort Sea-Mackenzie Delta area, stratigraphic and paleontological work will be continued in northern Yukon Territory.

\*based on preliminary program as of 1 February 1971

## APPENDIX A

G.S.C. reports and maps issued in 1970 dealing with Yukon Territory and Northwest Territories

### Bulletins

Blackadar, R.G.

Precambrian geology of northwestern Baffin Island, District of Franklin; Bull. 191.

Gleeson, C.F.

Heavy mineral studies in the Klondike area, Yukon Territory; Bull. 173.

### Memoirs

Heywood, W.W. and Davidson, A.

Geology of Benjamin Lake map-area, District of Mackenzie; Memoir 361.

### Papers

Balkwill, H.R. and Yorath, C.J.

Simpson Lake map-area; Paper 69-10.

Baragar, W.R.A.

The geochemistry of the Coppermine basalts; Paper 69-44.

Bell, R.T.

Preliminary notes on the Hurwitz Group, Padlei map-area, N.W.T.; Paper 69-52.

Davidson, A.

Precambrian geology, Kaminak Lake map-area, District of Keewatin; Paper 69-51.

Donaldson, J.A.

Descriptive notes to accompany a geological map of central Thelon Plain, Districts of Keewatin and Mackenzie; Paper 68-49.

Findlay, D.C.

The mineral industry of Yukon Territory and north-western District of Mackenzie; Paper 69-55.

Henderson, J.B.

Stratigraphy of the Archean Yellowknife Supergroup, Yellowknife Bay-Prosperous Lake area, District of Mackenzie; Paper 70-26.

Hornbrook, E.H.W. and Allan, R.J.

Geochemical exploration feasibility study within the zone of continuous permafrost; Coppermine River region N.W.T.; Paper 70-36.

Hughes, O.L.

Distribution of open-system pingos in central Yukon Territory with respect to glacial limits; Paper 69-34.

Kindle, E.D.

Preliminary report on the copper deposits, Coppermine River area, District of Mackenzie; Paper 70-49.

Norford, B.S. *et al.*

Biostratigraphic determination of fossils from the sub-surface of the Yukon Territory and Districts of Mackenzie and Franklin; Paper 70-15.

Reinhardt, E.W.

Geology of the Precambrian rocks of Thubun Lakes map-area; Paper 69-21.

Tassonyi, E.J.

Subsurface geology, lower Mackenzie River and Anderson River area, District of Mackenzie; Paper 68-25.

Yorath, C.J. and Balkwill, H.R.

Stanton map-area, N.W.T.; Paper 69-9.

### Final Maps

Blackadar, R.G.

Nottingham, Salisbury and Mill Islands (Geology); Map 1205A; Scale 1:250,000.

Fraser, J.A.

Winter Lake (geology), District of Mackenzie; Map 1219A; Scale 1 inch to 4 miles.

Green, L.H.

Mayo Lake, Yukon Territory; Map 1270A; Scale 1:50,000.

Green, L.H.

Scougale Creek, Yukon Territory; Map 1269A; Scale 1:50,000.

Taylor, F.C. *et al.*

Wholdaia Lake, District of Mackenzie; Map 1199A; Scale 1:250,000.

### Preliminary Maps (in addition to those accompanying papers)

Keer, J.Wm.

Southwestern Ellesmere Island; Map 10-1968; Scale 1:125,000.

### Derived Series:

Downward continuation map, Arctic Project – District of Franklin; Map 24-D-1969.

### Open File Items (available to the public either by sale or inspection)

Balkwill, H.R. and Yorath, C.J.

Brock River map-area, District of Mackenzie; O.F. 40.

Cook, G.D. and Aitken, J.D.

Coleville Lake map-area and part of Ermine Lake map-area, N.W.T.; O.F. 33.

Heywood, W.W. and Sanford, B.V.

Eleven preliminary maps of Southampton Island; Scale 1:250,000; O.F. 30.

Hughes, O.L.

Preliminary drafts of 5 surficial geology maps, Mackenzie District; N.W.T., O.F. 26.

Rampton, V.

Preliminary drafts of surficial geology maps, N.T.S. 96 E, F, L, 106 I, J, O, P, 107 B, 117 A, C, D; Scale 1:250,000; O.F. 21.

Thorsteinsson, R. *et al.*

Manuscript geological maps of Eureka Sound North, Eureka Sound South, Strand Fiord, Glacier Fiord, Haig-Thomas Island and Middle Fiord map-areas; Scale 1:125,000; and Slidre Fiord map-area; Scale 1:50,000; O.F. 28.

Thorsteinsson, R. *et al.*

Manuscript geological maps of Cape Stallworthy, Bukken Fiord, Tanquary Fiord, Otto Fiord, Greely Fiord, Canon Fiord, Strathcona Fiord and Bauman Fiord map-areas, District of Franklin; O.F. 38; Scale 1:125,000.

Gamma-ray spectrometer profiles, Ottawa — Yellowknife; O.F. 22.

## APPENDIX B

## FRANKLIN, KEEWATIN AND MACKENZIE

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
500336	Devonian of Alberta, British Columbia and southern District of Mackenzie	Belyea, Helen R	ISPG	SRS	Mack BC Alta	Pts 72,73,74,82,83, 84,85,94,95
	Obj.: To publish a series of papers on the Devonian, discussing rock types, correlations, facies changes, disconformities, faults, etc. in an attempt to elucidate the reasons for Devonian facies distribution and hence designate general areas of potential hydrocarbon reservoir rocks.					
550004*	Cretaceous and Jurassic of Richardson Mountains, Porcupine Plains, and Eagle Plains	Jeletzky, JA	ISPG	WP	Mack Yk	116;106 W1/2
	Obj.: To study the stratigraphy and paleontology of Cretaceous and Jurassic formations of the region in order to understand the most essential features of the facies pattern, sequence, and lateral extent of lithological units, palaeogeography and geological history. To describe and to figure the most important elements of the faunas.					
570019*	Geology of iron and manganese deposits in Canada	Gross, GA	EGG	MD	— Kee, Ont, Que, Nfld	—
	Obj.: To carry out comprehensive research on the geology of iron and manganese deposits in order to provide a geological basis for exploration and assessment of iron and manganese potential in Canada. The research is to provide: (1) a systematic record and appraisal of geological data; (2) a geological classification of deposits; (3) definition of criteria for recognition of each type of deposit; (4) development of concepts and hypotheses on geological environment, provenance, and genetic processes of iron and manganese deposits; (5) determination of regions and geological units in Canada most favourable for the occurrence of each type of deposit.					
509283	Muskox Intrusion	Irvine, TN	CG	Pet	Mack	86 D/3,J/2,3,7,11,14,16
	Obj.: To determine the chemical, petrographic and mineralogical characteristics of the Muskox intrusion with the purposes of describing its crystallization history, relating it to events of basaltic magmatism in the Coppermine province, and defining its significance in relation to the general origin of layered intrusion.					
600213	Mid-to Late Cretaceous (Hauterivian) to Maestrichtian) index fossils of western Cordillera	Jeletzky, JA	ISPG	WP	Mack, Yk, BC, Alta	
	Obj.: To prepare a series of fossil plates illustrating a selection of best-known and most useful mid-to late Cretaceous (Hauterivian to Maestrichtian) marine invertebrate fossils of the western Cordillera. A simple correlation chart and introductory remarks will illustrate the zonal sequence of all figured index fossils and their age in terms of the international standard stages.					
610002	Axel Heiberg and Ellesmere Islands	Thorsteinsson, R	ISPG	SRS	Frank	39 G,H;49 C-H; 59 E-H; 120 B,C.; 340 B,C;560 A,D
	Obj.: (a) To obtain information on and improve the understanding of the age, structure, stratigraphy and origin of the post-Precambrian bedrock formations, and (b) to assess the economic potential of the area.					

Asterisk indicates project has a field component.

Brackets around project leader's name indicate seasonal employee or other non-staff

Underscore indicates province of 1971-72 field work.

610007	Operation Porcupine	Norris, DK	ISPG	SG	Mack Yk	106 E,F,L,M;107; 116 F E1/2, G-J,K E1/2, N E1/2, O,P
	Obj.: Critical evaluation of the structural geometry and stratigraphy within these map-areas of northern Yukon Territory and western District of Mackenzie for documentation of the nature, origin and mechanics of the deformation and its bearing on the hydrocarbon and mineral potential of the region.					
610330	Cretaceous index fossils of sedimentary basins of western and Arctic Canada	Jeletzky, JA	ISPG	WP	Frank, Mack Yk,BC,Alta	
	Obj.: To publish a series of fossil plates illustrating a selection of best-known and most useful Cretaceous index fossils.					
610394	Schedule of Wells, NWT	Belyea, Helen R	ISPG	SRS	Mack	85;95;96;106
	Obj.: To provide geological information, particularly formation tops, required by Department of Indian Affairs and Northern Development for publication in the annual Schedule of Wells.					
620012	Geochemical and petrologic study of Yellowknife volcanic rocks	Baragar, WRA	CG	PS	Mack	85 J/8,9
	Obj.: To provide composition, petrographic, and stratigraphic data from which the volcanic character, eruptive history, and characteristic composition may be obtained.					
630003	Operation Grant Land — NE Ellesmere Island and NW Greenland	Christie, RL	ISPG	AI	Frank	120 C—G;340 C—F,H
	Obj.: To obtain a better understanding of the geological features of an orogenic belt extending across northeastern Ellesmere Island to adjacent Greenland.					
630006	Quaternary reconnaissance, north-west Baffin Island	Craig, BG	QRG	RSP	Frank	Pts 47 C—H,48 A—E, H, 58 A,D
	Obj.: Reconnaissance geological study and mapping of the surficial deposits and glacial features of that part of Baffin Island west of the 80th meridian, and adjacent small islands. Publ.sca.1:500,000.					
630009	Dubawnt Group sediments, N.W.T.	(Donaldson, JA, Prof)	CG	PS	Kee Mack	55NW;56SW;65 N;66 S; 75 NE;76 SE
	Obj.: To define the units within this group and to determine the provenance, dispersal patterns and depositional environments of its constituent sediments.					
630031*	Multispectral photography	Slaney, VR	EG	RSM	— Mack, Que	—
	Obj.: Development of multispectral aerial photography, including high-altitude and satellite photography, and methods of interpretation as a means of providing geological information.					
630415	Lower Cretaceous (Albian) stratigraphy of Peel and Snake Rivers, Yukon Territory	Chamney, TP	ISPG	WP	Mack Yk	106;107;116;117
	Obj.: Detailed biostratigraphic subdivision of the Lower Cretaceous (Albian) rocks of the northern Yukon and Arctic coastal plain based on the foraminiferal faunas recovered from the critical stratigraphic sections exposed on Peel and Snake rivers and described by Mountjoy and Chamney (GSC Paper 68—26). Such subdivision will provide a vital aid for the exploration of the petroleum resources of the Lower Cretaceous rocks of these regions and the western Arctic Islands.					

640004	Quaternary reconnaissance, western Arctic Islands	Fyles, JG	QRG	RSP	Frank	Pts 49,59,69,78,79,88,89, 97,98,99,340,560
	Obj.: To map and explain Quaternary deposits, landforms, and landscape processes in order to: (1) provide areal geological information; (2) determine Quaternary stratigraphy and history; and (3) document the nature and rate of landscape development processes. The project includes investigation of the Beaufort Formation.					
640011	Itchen Lake map-area	Bostock, HH	CG	PS	Mack	76 E W1/2; 86 HE 1/2
	Obj.: To outline the limits of gold-bearing rocks of the Yellowknife group; to determine the age and structural relations of the Yellowknife rocks and to ascertain the origin of the gold deposits; to complete mapping and structural interpretation of the Proterozoic outlier at "Rockinghorse Lake" to assist in correlation between the Epworth and Goldburn groups.					
650003*	Cornwallis and adjacent smaller islands	Thorsteinsson, R	ISPG	SRS	Frank	58 F,G;68 E,H
	Obj.: (a) To improve the understanding of the age, structure, sequence, relationship, thickness, and origin of bedrock formations with a view to helping, (b) to assess the size, grade, mode of occurrence, origin, and potentialities of any fuel or mineral deposits that may occur; and (c) to improve the knowledge and understanding of the morphology of the Silurian and Devonian ostracoderms of Cornwallis Island, thus aiding in the establishment of a more useful stratigraphic framework for the region and contributing to objective (a).					
650008	Stratigraphy, sedimentology and correlation of the Nonacho Group, N.W.T.	McGlynn, JC	CG	PS	Mack	Pts 75 E,F,K
	Obj.: To define the sedimentology and stratigraphy of Nonacho Group and relationships of these rocks to surrounding igneous rocks as a contribution to regional correlation and geological history of the region.					
650009	Petrologic and structural study of the McDonald Fault system south of Great Slave Lake	Reinhardt, EW	CG	PS	Mack	Pts 75 E;85 H
	Obj.: To describe and interpret the mylonites north and south of the McDonald Fault and their relationships to nearby Archaean and Proterozoic rocks; to estimate the order of magnitude and sense of horizontal and vertical components of movement along the McDonald Fault system; and to evaluate the possible correlation of the Yellowknife Group with highly metamorphosed rocks southeast of the McDonald Fault.					
650010	Operation Selwyn	Blusson, SL	CG	CPM	Mack, Yk,BC	105A,H,I,P;104 O; 95 D
	Obj.: To establish the stratigraphic sequence and determine the nature of abrupt facies changes in lower Paleozoic rocks of western Mackenzie and Selwyn Mountains and to study the relationship and distribution of formations that are host to large base-metal deposits, as a contribution to the economic development of the north. Publ.sca. 1" — 4 mi.					
650024*	Cambrian biostratigraphy of the Canadian Cordillera	Fritz, WH	ISPG	WP	Mack, Yk BC, Alta	—
	Obj.: To identify and describe Cambrian fossils from the Canadian Cordillera, ascertain their relative stratigraphic positions, and provide faunal correlations for their enclosing strata.					
660006	Granite studies in the Ennadai-Rankin Inlet Region	Davidson, A	CG	PS	Kee	Pts 55 W1/2,65 E1/2
	Obj.: To classify the granitic rocks according to age, geological and chemical nature, geophysical parameters where available and to relate them to the regional geology and mineral deposits.					

660007	Studies of the Coppermine River volcanic rocks, N.W.T.	Baragar, WRA	CG	PS	Mack	Pts 86 N,O
	Obj.: To determine the total composition, variation in composition, and stratigraphy of the Coppermine River volcanic succession and its relationships to Mackenzie dyke swarm and Muskox Complex. To provide data of assistance to prospecting.					
660009	A sedimentological and stratigraphic study of the Great Slave and Et Then Groups in the East Arm fold belt, Great Slave Lake	Hoffman, PF	CG	PS	Mack	Mainly 75 L
	Obj.: To refine existing stratigraphic descriptions and relationships of the sedimentary and volcanic rocks to determine source regions and dispersal patterns in the sedimentary fill; to determine depositional environments and to reconstruct the Palaeogeographic history of the sedimentary basin.					
660020	Structural and palaeomagnetic fabric of the Mackenzie Arc	Norris, DK	ISPG	SG	Mack Yk	106;107;116;117
	Obj.: The role of the Mackenzie Arc in the depositional and structural history of the western Interior Plains and Mackenzie Mountains as it may have influenced the temporal and spatial relations of stratigraphic and structural traps in the area.					
660042*	Regional aeromagnetic – geologic correlation	Kornik, LJ	EG	MM	Mack Sask Man,Ont	74 M–P;75 A–H; 64
	Obj.: A regional study to correlate geology with magnetic patterns and anomalies by means of <i>in situ</i> magnetic susceptibility and remanent magnetism measurements of oriented samples.					
670002	Operation Bylot	Jackson, GD	CG	PS	Frank	27;37;38;48
	Obj.: A reconnaissance geological survey of a previously unmapped area to describe and interpret the broad geological framework and to outline areas of potential economic interest.					
670014*	Operation Winisk	Norris, AW	ISPG	PS	Kee, Man Ont, Que	54 A–G, K–M; 53 H N1/ 2,I, J,O,P; 43 B,C,D E1/2; 42 M E1/2,N1/2 F–H, L E1/2,N–P
	Obj.: To study, map and interpret the bedrock geology of the Hudson Bay Lowlands; to determine the age, thickness, distribution and structure of the rocks for evaluating the economic potential of the area.					
670016*	SW Ellesmere – W. Devon Islands (Operation Grinnell)	Kerr, JW	ISPG	AI	Frank	49 B,C;58 G,H;59 A, B,D;69 A
	Obj.: To improve the understanding of the stratigraphy and structure of the region which is a key area for information in both of these fields; a primary purpose is to aid in evaluation of the resource potential of this part of the north – particularly petroleum.					
670018	Baffin Island – Foxe Basin – Melville Peninsula (Operation Foxe Basin)	Trettin, HP	ISPG	AI	Frank	36 N,O;37 A–C,F,G; 47 A,D
	Obj.: To obtain an improved understanding of the stratigraphy, structures, and historical geology of the lower Paleozoic sedimentary rocks of the Foxe Basin region with a view particularly to evaluating the petroleum potential of the region.					

670031*	Quaternary reconnaissance, southern Ellesmere Island	Blake, W Jr	QRG	RSP	Frank	38 G; 39 B,C; 49 A–D 59 A,D
	Obj.: Reconnaissance mapping of glacial deposits, landforms, and other Quaternary features in order to provide descriptive data on the Quaternary geology and geomorphology of the assigned area; to determine the chronology of events during glaciation and deglaciation; to gather information on marginal fluctuations of glaciers, modern geologic processes, and changing environments. Publ. Sea. 1:500,000.					
670041*	VLF mapping	Collett, LS	Eg	Em	Mack Man, Ont Que	31G; 32 G; 64 A; 54 D, 63 P; 107 C,D
	Obj.: To assess the capabilities and limitations of using VLF radio waves as a means of providing geological information to delineate fault and shear zones.					
670052*	Gamma-ray support	Charbonneau, BW	EG	RSM	— Mack, Que	—
	Obj.: To provide detailed ground and laboratory investigations (geological and radiometric) to correlate with airborne data and establish its reliability and significance and to enable airborne measurements to be calibrated in terms of ground concentration.					
670053*	Radioisotope methods	Grasty, RL	EG	RSM	— Mack, Que	—
	Obj.: (1) To develop application of lightweight portable radioisotope instrumentation for geological field use, especially <i>in situ</i> analyses of rock composition and (2) to provide laboratory analyses by radioisotope methods of control samples collected in support of airborne gamma spectry and airborne geochemistry.					
670054*	Infrared scanning	Slaney, VR	EG	RSM	— Mack	—
	Obj.: To recognize the surface distribution of rocks, soils, drainage and fracture patterns using IR scanning techniques. To determine the optimum conditions for IR surveys by studying the effects of day and night changes, seasonal changes and the effect of weather on the response of the ground.					
670068*	Operation Norman	Cook, DG	ISPG	QG	Mack	86 D,E,L,M; 87 B,C; 96; 97 A–D,F; 106 A,B,G– J,O,P; 107 A,D,E
	Obj.: To complete reconnaissance geological mapping, to conduct stratigraphic and structural studies, and to evaluate the economic potential of bedrock formations in the subject area; to embody the results of these studies in an integrated series of reports and maps, some under single authorship and others under multiple authorship according to the topic of the contribution.					
670557	Stratigraphy and ages of Pre-cambrian sedimentary rocks and contained sills and dykes, east coast of Canadian Arctic Islands and north and northwest Greenland	Christie, RL	ISPG	AI	Frank	27–29; 37–39; 47–49; 57–59; 120; 340; 560
	Obj.: (a) to correlate or distinguish Precambrian sedimentary basins and to obtain information on movement of continental masses; (b) aided by age determinations on diabase-gabbro sill rocks and other intrusive rocks, to compare the tectonic history of the Precambrian sedimentary rocks of the region.					
670576*	Canadian Triassic Ammonoidea and Bivalvia	Tozer, ET	ISPG	WP	Frank, Yk Bc, Alta	—
	Obj.: To describe and assess biochronological significance of Triassic Ammonoidea and Bivalvia in order to refine methods for dating Triassic rocks.					

680012	Paleomagnetic study of Proterozoic red beds of the western Canadian Shield	McGlynn, JC	CG	PS	Kee Mack Sask	65;66;74;75 E,F;85; 86
	Obj.: to obtain paleomagnetic pole positions from various Proterozoic red bed sequences in the western Precambrian Shield for purposes of correlation.					
680015	Geological reconnaissance of eastern Devon Island, with additional stratigraphic studies on southeastern Ellesmere Island	Christie, RL	ISPG	AI	Frank	38 F,G;39 B,C,F-H; 48 E-H;49 A,B,D
	Obj.: (a) Obtain reconnaissance data for the Precambrian rocks of eastern Devon Island so that: (i) these rocks and their history may be compared to those of the Canadian Shield; (ii) the structure of this area may be plotted and studied in the light of known structures of Ellesmere Island, Baffin Island, Greenland, and the intervening channels and Baffin Bay. (b) Obtain reconnaissance data for the sedimentary rocks of eastern Devon Island so that the stratigraphy of the Ellesmere – Devon – Baffin Island region may be better understood. An understanding of the stratigraphy of this large 'shelf'-type region will aid in defining the stratigraphic framework of the potentially oil-bearing basins to the west. (c) Obtain additional data (to add to data obtained in 1960 and 1961) on the Lower Paleozoic formations of southeast Ellesmere Island so that: (i) maps on a scale of 1 inch to 4 miles or other suitable scale may be published; (ii) the stratigraphy of southeastern Ellesmere Island may be better understood (as (b), above).					
680032	Quaternary reconnaissance, north-west District of Mackenzie	Fulton, RJ	QRG	RSP	Mack	86 F,L,M,96 I-P;87 B, C;97 A-D,F,,106I,J, O,P;107 A,D,E
	Obj.: To map and explain Quaternary deposits and landforms in order to: (1) establish their stratigraphic sequence and age and outline the Quaternary history of the area; and (2) provide areal geological information including data applicable to permafrost and engineering studies.					
680040	Proglacial geomorphology, Generator Lake, Baffin Island	Barnett, DM	QRG	RSP	Frank	Pts 27 C;37 D
	Obj.: To map and explain glacial, lacustrine, and related landforms and deposits associated with both present and former levels of Generator Lake and to measure pertinent aspects of modern glacio-lacustrine processes in order to elucidate the geomorphology and chronology of the area as a model of the proglacial lacustrine environment.					
680047*	Geomorphic processes, Mackenzie Valley – Arctic coast	(Mackay, JR Prof)	QRG	EGG	Mack Yk	Pts 85,95,96,97, 106,107,117
	Obj.: To describe, measure, and explain geomorphic features and processes related to permafrost, and to fluvial, lacustrine, coastal, eolian, and mass wasting activity in a permafrost environment.					
680057	Sedimentological study of the Hornby Group	(Donaldson, JA Prof)	CG	PS	Mack	86 N1/2;96 N E1/4
	Obj.: To interpret the depositional history of the sedimentary units in the Hornby Bay Group and to assess possible correlations with similar rocks elsewhere on the Precambrian Shield. Publ. sca. 1" – 4 mi.					
680064*	Stratigraphy and paleontology of Upper Paleozoic rocks on parts of Ellesmere and Axel Heiberg Islands	Nassichuk, WW	ISPG	AI	Frank	49 B,F,G,H;340 A-D;560 A
	Obj.: To improve the understanding of the stratigraphy and facies relationships of the marginal and axial parts of the Sverdrup Basin; to establish a biostratigraphic framework for Carboniferous and Permian rocks; to evaluate the economic potential of the area.					

680065	Pumice on raised beaches, eastern Arctic Canada	Blake, W Jr	QRG	Pg	Frank Kee, Que. Nfld	Pts 120,340,29,39,49, 59,69,38,48,58,68,27, 37,47,57,16,26,36,46, 15,25,35,14,24,13
	Obj.: To locate sites where pumice occurs on raised beaches in eastern Arctic Canada and determine elevation, age, and origin of the pumice in order to: (1) correlate raised marine levels throughout the region; (2) calculate regional tilt of raised marine features, using pumice level as a guide horizon; and (3) determine the form of the last ice sheet.					
680068*	Mesozoic palynology and bio- stratigraphy, western and northern Canada	Hopkins, WS Jr	ISPG	WP	Frank Mack, Yk BC, Alta	—
	Obj.: Description of microfloras from Mesozoic rocks, particularly the Sverdrup Basin. Establishment of sequence of floral zones necessary for biostratigraphic control in this region of active exploration for petroleum resources. Ultimately the project will allow description of floral evolution and migration through the Mesozoic and into the Tertiary.					
680081*	Queen Air high resolution aeromagnetics	Hood, PJ	EG	MM	Mack Ont,Que	—
	Obj.: 1. To design, fabricate, install and test a high-resolution rubidium vapour aeromagnetic survey system in a Queen Air aircraft. 2. To conduct high-resolution aeromagnetic test surveys with this system to evaluate its use as an aid to geological mapping.					
680085	Structural and stratigraphic study of the Precambrian rocks of southwestern Keewatin, N.W.T.	Eade, KE	CG	PS	Kee	65 A W1/2,B,C,G W 1/2 L W1/2
	Obj.: To determine: (1) the relationships of the known Hurwitz group rocks to other metasedimentary units, and the extent and characteristics of the original basins of deposition in order to assess their potential for mineral occurrences (2) the petrology and mineral potential of the post-kinematic fluorite bearing porphyritic rocks.					
680092	Geology of Southampton Island	Heywood, WW	CG	PS	Kee	45 M—P;46 A—C,F; pts 46 D,E,G
	Obj.: To conduct a geological study of Southampton Island, N.W.T., with particular attention to: (1) correlation of the Precambrian rocks with those in eastern Keewatin and Baffin Island; (2) the determination of the basic stratigraphy of the Paleozoic rocks and the economic potential of the region.					
580093*	Devonian biostratigraphy, western and northern Canada	Pedder, AEH	ISPG	WP	Frank,Mack Yk,BC,Alta	—
	Obj.: Establishment and refinement of Devonian faunal sequences to allow correlation of Devonian rocks of western and northern Canada. The project will provide time control that will aid greatly the search for Devonian stratigraphic traps and thus assist the exploration of the natural resources of the Devonian rocks of the region.					
680101*	Conodont biostratigraphy of Palaeozoic rocks of the Arctic islands	Uyeno, TT	ISPG	WP	Frank	49;58;59;68;69;78; 79;88;79;560
	Obj.: To set up zonal standards for conodonts for the Arctic Islands to correlate conodont and palynomorph zones in measured sections; and to obtain fossil data of immediate use to those engaged in geological mapping of the Arctic Islands.					

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|---------|--|---------------|------|------|-------------------------|-------------------------------------|
| 680113* | Biostratigraphy study of Paleozoic palynomorphs of the Arctic islands  | McGregor, DC  | CG   | EP   | Frank                   | 49;58;59;68;69;78;79;88;89;560      |
|         | Obj.: (1) To set up zonal standards for palynomorphs for the Arctic islands. (2) To correlate palynomorph zones with conodont zones on measured sections. (3) To obtain fossil data of immediate use to those engaged in geological mapping of the Arctic Islands.   |               |      |      |                         |                                     |
| 680119  | Operation Stewart  | Blusson, S    | CG   | CPM  | Mack,Yk                 | 105 N,O;106 B,C                     |
|         | Obj.: To outline and interpret the regional stratigraphy and structure in a previously unmapped part of the Selwyn basin and to relate these features to the search for mineral deposits analogous to the Keno Hill and Vangorda deposits to the west and south. Publ. sca.1" – 4 mi.  |               |      |      |                         |                                     |
| 680123* | AFMAG surveys  | Collett, LS   | EG   | EM   | Mack,<br>Sask.Man<br>NS | Pts 74 N,63 I,J,K,N,O,<br>P; 11 E,F |
|         | Obj.: To assess the value of airborne AFMAG surveys as aids to geological mapping and exploration.   |               |      |      |                         |                                     |
| 680134  | Regional distribution of gaseous hydrocarbons in the Arctic archipelago and northern mainland  | McCrossan, RG | ISPG | GofP | Frank<br>Mack           | —                                   |
|         | Obj.: To examine the presence of source rocks and near-surface hydrocarbon accumulations in the Arctic archipelago in order to evaluate the potential for hydrocarbon occurrence in commercial quantities.   |               |      |      |                         |                                     |
| 690002* | Sedimentology and stratigraphy of clastic formations in the Arctic islands   | Trettin, HP   | ISPG | AI   | Frank                   | —                                   |
|         | Obj.: To elucidate the pattern and history of clastic sedimentation in the Arctic Islands with a view to aiding the discovery of petroleum deposits.   |               |      |      |                         |                                     |
| 690005* | Structural geology of northern Yukon Territory and northwestern District of Mackenzie  | Norris, DK    | ISPG | SG   | Mack<br>Yk              | 117 A–D                             |
|         | Obj.: Critical evaluation of the structural geometry of Richardson, Barn and British Mountains, intervening plateaux, and adjacent coastal plain for documentation of the nature, origin and mechanics of the deformation and its bearings on the hydrocarbon and mineral potential of the region.   |               |      |      |                         |                                     |
| 690020* | Mesozoic-Tertiary stratigraphy and sedimentation – Beaufort-Mackenzie area   | Yorath, CJ    | ISPG | MS   | Mack<br>Yk              | 106 N;107;116 N;<br>117             |
|         | Obj.: To determine the geological history of the Beaufort-Mackenzie Basin; to provide geological data in order to assist in the establishment of proper conservation regulations; and to contribute to the realization of the economic potential of the area.  |               |      |      |                         |                                     |
| 690024* | A stratigraphic, sedimentological, and paleontological study of the Epworth Group, northcentral District of Mackenzie  | Hoffman, PF   | CG   | PS   | Mack                    | Pts 86                              |
|         | Obj.: (1) to define the rock stratigraphic framework of the fold belt; (2) to establish regional correlation with the Great Slave, Goulburn and Snare belts; and (3) to determine the paleogeographic history of the sedimentary basin and the surrounding region, the probability and location of stratiform and peneconcordant mineral deposits, and the time-stratigraphic zonation of the Precambrian. |               |      |      |                         |                                     |

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| 690025  | Sedimentary geology of the Coppermine area  | (Donaldson, JA Prof) | CG  | PS  | Mack           | 86 N,O                          |
|         | Obj.: To define in NTS 86 O & N the units within the Coppermine sedimentary rocks, to determine their provenance, dispersal patterns, depositional environments economic potential and correlation with similar rocks elsewhere in the Shield. Publ. sca. 1" — 4 mi.  |                      |     |     |                |                                 |
| 690028* | Operations Coppermine and Bathurst Inlet  | Fraser, JA           | CG  | PS  | Kee Mack       | Pts 66,67,76,77,85, 86,87,96,97 |
|         | Obj.: To provide reconnaissance geological information and assess the economic mineral potential of 120,000 square miles of mainly unmapped terrane in the northwest Canadian Shield.   |                      |     |     |                |                                 |
| 690036* | Regional geochemical census of plutonic rocks in the eastern Yukon  | Garrett, RG          | EGG | G   | Mack Yk        | 95 E; 105 A,G,H,I—P; 106 D      |
|         | Obj.: (1) To ascertain whether differences in geochemistry of these plutons can be used to distinguish those that have related deposits of W, Mo, Sn, Au, and Cu and those that do not. (2) To contribute chemical data on these rocks which may be used in interpreting their geological occurrence and correlation.   |                      |     |     |                |                                 |
| 690039* | Transport and deposition of ore indicator elements in streams and sediments and in lake waters  | Nigrini, A           | EGG | G   | Mack NB        | 86 N/8,9;21 O/9 W 1/2, 7 E1/2   |
|         | Obj.: To provide concepts for the development of new geochemical exploration methods and the means for interpreting geochemical surveys. By studying the mechanism of the transport and deposition of ore indicator elements in streams, stream sediments and organic material.   |                      |     |     |                |                                 |
| 690040* | Seismic — Beaufort-Mackenzie  | Hobson, GD           | EG  | SM  | Mack           | 106;107;117                     |
|         | Obj.: To acquire seismic data in the Mackenzie delta-Beaufort Sea area probably through participation surveys and to provide the 3rd dimension required by I.S.P.G. geologists to interpret sedimentation and structural history of the area.   |                      |     |     |                |                                 |
| 690044  | Fossil mosses in the Arctic   | (Kuc, M)             | QRG | PG  | Frank,Mack     | —                               |
|         | Obj.: 1. To provide information on age and environment of origin of Beaufort, interglacial, and post-glacial deposits in the western Arctic through identification of fossil mosses and other organic remains and study of fossil floras. 2. To develop and illustrate a method for biostratigraphic and paleoecologic analyses of postglacial Arctic peat profiles.  |                      |     |     |                |                                 |
| 690047* | Quaternary geology, Beaufort-Mackenzie  | Rampton, V           | QRG | RSP | Mack Yk        | 97 F;107 B—E;117 A,C,D          |
|         | Obj.: To map and explain Quaternary deposits and landforms in order to: (1) establish their sequence and age and outline the history of preglacial, interglacial, glacial, and post-glacial events; and (2) provide areal and stratigraphic geological information including data applicable to permafrost and engineering studies and petroleum development.   |                      |     |     |                |                                 |
| 690050* | Microdeposits as a probabilistic indicator of ore potential   | Cameron, EM          | EGG | G   | — Mack,Ont,Que | —                               |
|         | Obj.: To determine the frequency distribution of metallic elements in barren and host rocks of known ore potential for the purpose of: (1) developing geochemical methods to forecast the ore potential of a belt or rock unit; (2) developing methods that may be applied to exploration for buried ore deposits by drilling on a probabilistic basis; (3) developing methods of obtaining, interpreting and presenting geochemical and geological data such that they may be used for making statistical investment decisions |                      |     |     |                |                                 |

690054*	Erosion in a permafrost environment	Heginbottom, JA	QRG	EGG	Mack	Pt 107 B,C
	Obj.: To document the nature, extent, and rate of erosion in permafrost areas disturbed by activities of man; and to determine the importance of surface material, geomorphology microclimate, snow cover, vegetation, depth of active layer, ground ice distribution and other factors on controlling erosion.					
690061	Operation Penny Highlands	Jackson, GD	CG	PS	Frank	Pts 16,26,27,36,37
	Obj.: A reconnaissance geological survey of a previously unmapped area to describe and interpret the geological framework and outline areas of potential economic interest.					
690067*	Federal-Provincial Aeromagnetic Surveys – Yukon, N.W.T.	MacLaren, AS	EG	SP	Mack Yk	76 L,N;86 N1/4,A,B,C,E–L, M–P;105 M;106 C,D N1/2,E, F;116 A N1/2,B N1/2, N1/2F–H
690068*	Federal-Provincial Aeromagnetic Surveys – Keewatin and Mackenzie, N.W.T.	MacLaren, AS	EG	SP	Kee Mack	N1/2 55 M,N,O; 56 A–P; N 1/4 65 F,G;65 J–P; 66 A–D, E–P; 75P
690070*	Federal-Provincial Aeromagnetic Surveys – Central Baffin Island	MacLaren, AS	EG	SP	Frank	16 K–M;26 I,J,K,L,M, N,O,P; 27A,B,C,D;36P;37A,B
690072*	Federal-Provincial Aeromagnetic Surveys – Labrador and S. Baffin Island	MacLaren, AS	EG	SP	Frank Nfld	13 A,B,C-G,H–J,K–O; 14 B–F, L,M; 16 E; 23A,B, G–J, PtO, P;24 A,H,I,P;25 A,I–P;26 A–H; 35 P;36 A–I
	<sup>a</sup> Obj.: To provide aeromagnetic maps to aid in mineral exploration and geological mapping; to lay down technical specifications and administer contracts with various geophysical companies; and to ensure that specifications are adhered to in order to produce aeromagnetic maps at scales of 1:63,360 and 1:253,440.					
700014*	Mineral indicator tracing, southern Keewatin	Shilts, WW	QRG	EG&G	Kee	55 E,F,K,L (mainly)
	Obj.: To determine the dispersion pattern of rock, mineral and chemical components of eskers and till relative to their source in the bedrock, with particular reference to the application of this knowledge in delineating geological bodies masked by the drift and in the search for mineral deposits.					
700015*	Yellowknife and Hearne Lake map-areas, Dist. of Mackenzie	Henderson, JB	CG	PS	Mack	85 I,J
	Obj.: To revise and interpret the geology and economic potential of the Precambrian terrain of the project area known only through earlier gross reconnaissance					

<sup>a</sup>Objective applies to projects 690067, 690068, 690070 and 690072.

700029	Operation Peel Sound stratigraphy and structure of Prince of Wales Island, adjacent small islands, and localities on Stefansson Island, Somerset Island, and Boothia Peninsula	Christie, RL	ISPG	AI	Frank	67 D,E,G,H;68 A-E; 78 D;58 B,C,F
	<p>Obj.: (a) To improve the understanding of the stratigraphic framework of the Paleozoic rocks of Prince of Wales Island; especially in terms of: (i) facies relationships, (ii) stratigraphic correlations with formations in the adjacent 'shelf' region and in the Franklinian Geo-syncline. This understanding will aid in the petroleum exploration about to begin in adjacent sedimentary basins and on Prince of Wales Island.</p> <p>(b) To determine the tectonic history of the Boothia Uplift: (i) such knowledge will be of vital importance in the petroleum exploration of the regions to the east, west, and north of the exposed Boothia Uplift; (ii) more data on the major structure, the Boothia Uplift, will provide a better understanding of the structure and history of the continent.</p>					
700034	Devonian biostratigraphy of northern Yukon Territory and adjacent District of Mackenzie	Norris, AW	ISPG	PS	Mack Yk	106 W1/2; 116 E3/4; 1117S1/2
	<p>Obj.: To include (a) delineation of facies distribution of Devonian rocks in area; (b) identification and determination of ranges of fossils for refining correlations with other areas, determination of the distribution of faunal provinces and paleogeography of Devonian seas; and the obtainment of more information on the Upper Silurian and Lower Devonian, an interval particularly well represented in the southern part of the area.</p>					
700040	Eureka Sound-Robeson Channel (NTS 340,560,120) map-area. 1:1 million Geological Atlas Program	Trettin, HP	ISPG	AI	Frank	340,560,120
	<p>Obj.: To publish a modern compilation and synthesis of the geology of the map-area as a unit of a 1:1 million geological atlas of Canada. More detailed objectives are as Apr. 1, 1969 of File 116-6-4.</p>					
700046*	Development of regional geochemical exploration methods for Permafrost areas	Allan, RJ	EGG	G	Frank Mack	58 F,G; 76 J,K,N,O
	<p>Obj.: (1) To develop, test, and demonstrate the feasibility of geochemical methods suitable for reconnaissance prospecting in permafrost regions, and thus to provide industry with geo-chemical methods for outlining areas having an anomalously high content of economic elements in those regions with permafrost; (2) to investigate the fundamental problems involved in the application of geochemical prospecting methods in permafrost regions.</p>					
700048*	Petrology and structure of Daly Bay Complex and environs	Gordon, TM	CG	P	Kee	56 A S1/2,pts of 55 P, 46 D
	<p>Obj.: To determine the petrology and structure of the anorthosite-gabbro-gneiss-granulite complex in the Daly Bay region in order to provide an understanding of the origin, age, and stratigraphic relations within the complex as well as to the surrounding gneisses. Publ. sca 1*-2 mi</p>					
700052*	Volcanic study in the Ennadai Belt, Keewatin	Ridler, RH	CG	PS	Kee	Pts 55 W1/2, 65 E1/2
	<p>Obj.: To determine and analyse the Archean stratigraphy of the areas and its relationship to metallogeny and mineralization. To reconstruct the depositional history and evolution of the sequences. To assess the mineral potential of the Archean terrain and establish guides for future mineral exploration.</p>					

700060*	Devonian and older Paleozoic rocks, southern and central District of Mackenzie	MacKenzie, WS	ISPG	PS	Mack	95 A-C, F-K, N-P; 85 C-F, K-N, 106 H
	Obj.: To prepare for publication correlation charts and columnar sections of Devonian and older Paleozoic rocks and to select rock units for isopach and lithofacies maps that will elucidate the tectonic and depositional history of the basin.					
700062	Feasibility pilot study of geo-chemical reconnaissance methods in the Ennadai-Rankin Belt	Hornbrook, EHW	EGG	G	Kee	55 L
	Obj.: To help in assessing the mineral potential and to encourage mineral exploration in the far north.					
700064	Foraminiferal zonation of the Mesozoic and lower Cenozoic rocks of the Mackenzie delta and adjacent Arctic coastal plain	Chamney, TP	ISPG	WP	Mack Yk	97 B,C,F; 107 A-D; 117 A
	Obj.: Detailed biostratigraphic subdivision of the Mesozoic and lower Cenozoic rocks.					
700068*	Basin analysis of exposed Mesozoic and Tertiary strata in northern Yukon Territory in relation to the subsurface stratigraphy of Mackenzie delta-Beaufort Sea areas	Young, FG	ISPG	MS	Mack Yk	Pts 106N1/2, 107, 116N1/2, 117
	Obj.: 1) To elucidate and interpret the economic, tectonic, and historical significance of Mesozoic and Tertiary stratigraphy and sedimentology of northern Yukon Territory and northwestern District of Mackenzie. 2) To determine the relationships of this stratigraphy to the subsurface Mesozoic stratigraphy of the Mackenzie River delta, the Beaufort Sea continental shelf, the Alaskan north slope, and the Sverdrup Basin.					
700073*	Operation northern Melville Peninsula	Heywood, WW	CG	PS	Kee	47 A,B,C,D
	Obj.: To determine the general structural, historical and economic geology of a previously unmapped terrain in order to aid in the future economic development of northern Canada. Publ. sca. 1" - 8mi. or 1" - 4 mi.					
700074	CG PS Kee Operations Back River and Wager. Heywood, WW					46 D W1/2, E, F N1/2 47 A S1/2, 56 A, B, G-K, N-P, pts of 57, 67, 66 I-K, N-P.
	Obj.: To determine the general structural, historical, and economic-geologic features of this previously unstudied terrain as a basis for future economic development of this portion of northern Canada.					
700085	Statistical estimation of content and distribution of selected metals in Bear-Slave provinces based on geological factors	(A.M. Kelly)	EGG	GP	Mack.	86; pts. 75, 76, 85
	Obj.: To provide an estimate of the probable occurrence, content and distribution of deposits of copper, silver, zinc and gold in the Bear and Slave geological provinces of N.W.T.					
700092*	Surficial geology and geomorphology, Mackenzie Bay-Continental Shelf	Shearer, J.M.	QRC	RSP	Frank.	107 C,D,E,F; 117 D,E

Obj.: To map, describe and explain the unconsolidated deposits, associated organic remains, geomorphic and structural features, and permafrost occurrence on the Continental Shelf, Mackenzie Canyon and offshore part of the Mackenzie delta in order to: (1) provide a real geological knowledge including information required in connection with petroleum exploration and production, (2) determine Quaternary stratigraphy and history, and (3) identify the sedimentary and geomorphic processes operating in the area.

700094	Engineering geology, Mackenzie Valley Transportation Corridor	Isaacs, R.M.	QRG	EGG	Mack., Yk.	85,95,96, 106,107,117
	Obj.: To delineate the engineering characteristics of terrain (surficial geology) units in terms of texture, ground ice content, and performance as foundation materials; to identify and evaluate the mechanism and rate of active geomorphic processes; and to develop criteria for measurement and prediction of the interrelationship between engineering construction and terrain performance.					
NP* (1)	Feasibility study of geochemical sampling of streams reaching coast of Arctic Is. by helicopter from MOT icebreaker	Dyck, W	EGG	G	Kee	—
	Obj.: 1) To determine whether significant geochemical anomalies can be indicated by such sampling. 2) To ascertain feasibility of using ship-based helicopters for sampling.					
NP* (2)	Geochemical reconnaissance of Bear Province	Cameron, EM	EGG	G	Mack	—
	Obj.: To choose an area for a proposed major geochemical inventory in 1972 and to select operating bases and fuel dumps.					
NP* (3)	Study of metallogenesis and mineral potential of the Melville Peninsula, Wager Bay, and Ennadai Belts of the Northwest Territories	(Seasonal recruit geologist)	EGG	MD	Kee	—
NP* (4)	A study of the metallogenesis and mineral potential of the Bear and Slave Provinces	(Support scientist vice Bottrill)	EGG	MD	Mack	—
NP* (5)	Granite studies in the Slave Province	Davidson, A	CG	PS	Mack	Pts 85
NP* (6)	Maguse River (NTS 55) map-area. 1:1 million Geological Atlas Program	Davidson, A	CG	PS	Kee	55
	Obj.: To publish a modern compilation and synthesis of the geology of the map-area as a unit of a 1:1 million geological atlas of Canada. More detailed objectives are as April 1, 1969 of File 116-6-4.					
NP (7)	Lockhart River (NTS 75) map-area. 1:1 million Geological Atlas Program	McGlynn, JC	CG	PS	Mack	75
NP (8)	Slave River (NTS 85) map-area. 1:1 million Geological Atlas Program	McGlynn, JC	CG	PS	Mack	85
NP (9)	Quoich (NTS 46,56) map-area. 1:1 million Geological Atlas Program	Heywood, WW	CG	PS	Kee	46,56

NP (10)	Thelon River (NTS 66,67) map-area. 1:1 million Geological Atlas Program	Fraser, JA	CG	PS	Kee	66,67
NP (11)	Great Bear River (NTS 86,96) map-area. 1:1 million Geological Atlas Program	Fraser, JA	CG	PS	Mack	86,96
<sup>b</sup> Obj.: To publish a modern compilation and synthesis of the geology of the map-area as a unit of a 1:1 million geological atlas of Canada. More detailed objectives are as April 1, 1969 of File 116-6-4.						
<sup>b</sup> Objective applies to projects NP(7), NP(8), NP(9), NP(10).						
NP* (12)	Penrhyn Group metamorphic complex, southern Melville Peninsula, District of Franklin	Reesor, JE	CG	Pet	Frank	PTS 46 J,K,N,O
NP's (13)	Basin analyses	to be decided	ISPG	Adm	Frank Mack, Yk	—
Remarks: Objectives and details to be decided, but general purpose will be to obtain and maintain from all available sources an optimum three-dimensional knowledge of the geological features of each area (basin) as a means of guiding exploration planning, administration and regulation. Leader will be co-ordinator. Data to come from various projects and sources.						
NP* (14)	Structure, stratigraphy and mapping of Mesozoic rocks on the Ringnes and adjacent smaller islands	Balkwill, HR	ISPG	AI	Frank	69 C-D, F-G; 59 C,D,F; 79 D,E,H
NP (15)	Structural stratigraphic sub-surface investigations (Beaufort-Mackenzie Program)	Havard, KR	ISPG	SG	Mack; Yk	107 B; 117 A,B,C,D
NP (16)	Subsurface stratigraphy and basin analysis southern District of Mackenzie	Tassonyi, J	ISPG	PS	Mack	85,95
Remarks: Title and objectives to be determined.						
NP (17)	Subsurface stratigraphy and basin analysis, Arctic islands	Roy, K.	ISPG	MS	Frank	58,68,78,88, 89,59,69,79
Remarks: Title and objectives to be determined.						
NP* (18)	Carboniferous and Permian biostratigraphy of coral faunas, western and northern Canada	Bamber, EW	ISPG	WP	Frank, Mack, Yk, BC, Alta	—
Obj.: Documentation of faunal succession within stratigraphic framework previously established for Upper Paleozoic of Alberta, B.C., Yukon and District of Mackenzie. Description of coral faunas from these areas and Arctic Islands.						
NP* (19)	Mesozoic palynology	Brideaux, W.W.	ISPG	WP	Frank, Mack, Yk	—

Obj.: Study of dinoflagellate spores and pollen to establish biostratigraphic zonation and paleogeographic discrimination within sedimentary basins.

NP* (20)	Studies of Middle Devonian brachiopods of Arctic Islands	(Brice, D, Prof)	ISPG	WP	Frank	—
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Obj.: In order to refine biostratigraphic zonation of Middle Devonian rocks.

NP* (21)	Surficial geology and geomorphology of Melville Is.	Barnett, DM	QRG	RSP	Frank	Pts 78,79, 88,89
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Obj.: To map, describe and explain the unconsolidated deposits, landforms and permafrost conditions of Melville Island on a reconnaissance scale with particular reference to the terrain information required for land use planning and engineering development; to provide knowledge of the Quaternary history of the region. Publ. sca. 1:250,000.

NP* (22)	Surficial geology and land classification Mackenzie Valley Transportation Corridor	Hughes, OL	QRG	RSP	Mack	Pts 85,95,96, 106,116
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Obj.: To map, describe and explain the unconsolidated deposits, landforms, permafrost, ground ice, and organic (Muskeg) cover of the Mackenzie Valley Transportation Corridor in order to: (1) provide areal knowledge of geology and terrain, bearing particularly in mind the needs of government for terrain information in connection with land-use planning, pipeline proposals and other aspects of petroleum development, and engineering construction and (2) determine the Quaternary history of the region. Publ. sca. 1:250,000.

NP* (23)	Quaternary geology Yellowknife-Hearne Lake	Skinner, R.G.	QRG	RSP	Mack	85 I,J
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Obj.: To map, describe and explain the unconsolidated deposits and landforms on a reconnaissance scale with particular reference to (1) terrain information required for land-use planning (forestry) and engineering development and (2) information on the sequence of glacial and post-glacial events necessary as background for geochemical and related surveys. Publ. sca. 1:250,000.

NP* (24)	Terrain performance, Melville Island	Barnett, DM	QRG	EGG	Frank	Pts 78,79, 88,89
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Obj.: To prepare case histories of terrain performance encountered by airfields, roads, and "overland" vehicles, in relation to geological materials, geomorphic setting and ground ice.

NP (25)	Terrain sensitivity map series — Northwest Territories and Yukon Territory	Owen, EB	QRG	EGG	Frank; Kee; Mack; Yk	—
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Obj.: To prepare terrain sensitivity maps by compilation of available data supplemented by airphoto interpretation in order to meet the requirements of the Northern Economic Development Branch, DIAND, for the implementation of land use regulations. Publ. sca. 1:500,000.

NP* (26)	Geophysical investigations Mackenzie Valley Transportation Corridor	Wyder, JE	QRG	EGG	Mack; Yk	Pts 85,95,96,106, 116
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Obj.: To apply geophysical techniques to: (1) determination of thickness of permafrost; (2) mapping of occurrence of permafrost in the discontinuous permafrost zone; (3) determination of the amount and type of ground ice with relation to various types of surficial materials; and (4) determination of *in situ* parameters relative to engineering properties of surficial materials.

NP* (27)	Environmental geology of northern settlements (Inuvik) Mackenzie Valley – W. Arctic	Heginbottom,	QRG	EGG	Mack	Pt 107 B/7
NP* (28)	Environmental geology of Northern settlements (Tuktoyaktuk) Mackenzie Valley – western Arctic	Rampton, V	QRG	EGG	Mack	Pts 107 E/7, 8

<sup>c</sup>Obj.: To provide basic geologic data in order to: (1) identify and describe the pertinent geologic-geomorphic aspects of northern settlements to assist in planning for future development; and (2) delineate and evaluate the sources of granular and other earth materials useful in construction in terms of location, quantity, quality and performance. Pub. sca. as warranted.

<sup>c</sup>Objective also applies to NP\*(27)

Note: In NP'S (1-28). The bracketed number is not a project number but is only for identification in this text.

## APPENDIX C

Project Number	Title	YUKON Project Leader	Div.	Sect.	Prov.	NTS
510014	Wolf Lake map-area	Poole, WH	CG	CPM	Yk	105 B
	Obj.: Geological study and mapping of the Wolf Lake map-area so as to afford information on the age, structure and sequence of the bedrock formations and on the size, grade, mode of occurrence, origin, and potentialities of the mineral deposits, and thus aid economic development of an area along Alaska Highway. Highway. Publ. sca. 1" — 4 mi.					
530014*	Geology of Canadian lithophile metals (Li, Be, Sn, W, Mo)	Mulligan, R	EKG	MD	— Yk,BC,NB	—
	Obj.: To carry out comprehensive research on the geology of lithophile metals (lithium, beryllium, tin, and tungsten) in order to provide a geological basis for exploration and assessment of such deposits in Canada. The research is to provide: (1) a systematic record and appraisal of geological data; (2) a geological classification of deposits; (3) definition of criteria for recognition of each type of deposit; (4) development of concepts and hypotheses on geological environment, provenance, and genesis of the deposits; and (5) determination of regions and geological units in Canada most favourable for the occurrence of each type of deposit.					
580004*	Cretaceous and Jurassic of Richardson Mountains, Porcupine Plains, and Eagle Plains	Jeletzky, JA	ISPG	WP	Mack Yk	116;106 W1/2
	Obj.: To study the stratigraphy and paleontology of Cretaceous and Jurassic formations of the region in order to understand the most essential features of the facies pattern, sequence, and lateral extent of lithological units, palaeogeography and geological history. To describe and to figure the most important elements of the faunas.					
580009	Operation Pelly	Tempelman-Kluit,	Cgg	CPM	Yk	105 K,J,I,F,G
	Obj.: To describe the main rock units, their ages, stratigraphic and structural relationships, and geologic history; to relate these factors to the regional geology of Yukon Territory; and to show where possible the relation of known mineral deposits to this framework.					
600213	Mid- to late-Cretaceous (Hauterivian) to Maestrichtian) index fossils of western Cordillera	Jeletzky,JA	ISPG	WP	Mack,Yk, BC,Alta	—
	Obj.: To prepare a series fossil plates illustrating a selection of best known and most useful mid- to late-Cretaceous (Hauterivian to Maestrichtian) marine invertebrate fossils of the western Cordillera. A simple correlation chart and introductory remarks will illustrate the zonal sequence of all figured index fossils and their age in terms of the international standard stages.					
610007	Operation Porcupine	Norris, DK	ISPG	SG	Mack Yk	106 E,F,L,M;107;116 F E1/2,G—J,K E1/2,N E1/1,O,P
	Obj.: Critical evaluation of the structural geometry and stratigraphy within these map-areas of northern Yukon Territory and western District of Mackenzie for documentation of the nature, origin and mechanics of the deformation and its bearing on the hydrocarbon and mineral potential of the region.					

Asterisk around the project leader indicates project has a field component.

Brackets indicate seasonal employee or other staff.

Underscoring indicates province of 1971-72 field work.

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|---------|---|------------------|------|-----|-----------------------------|--------------------------------|
| 610330  | Cretaceous index fossils of sedimentary basins of western and Arctic Canada   | Jeletzky, JA     | ISPG | WP  | Frank, Mack<br>Yk, BC, Alta |                                |
|         | Obj.: To publish a series of fossil plates illustrating a selection of best-known and most useful Cretaceous index fossils.   |                  |      |     |                             |                                |
| 630415  | Lower Cretaceous (Albian) stratigraphy of Peel and Snake Rivers, Yukon Territory  | Chamney, TP      | ISPG | WP  | Mack<br>Yk                  | 106;107;116;117                |
|         | Obj.: Detailed biostratigraphic subdivision of the Lower Cretaceous (Albian) rocks of the northern Yukon and Arctic coastal plain based on the foraminiferal faunas recovered from the critical stratigraphic sections exposed on Peel and Snake rivers and described by Mountjoy and Chamney (CSC Paper 68-26). Such subdivision to provide a vital aid for the exploration of the petroleum resources of the Lower Cretaceous rocks of these regions and the western Arctic islands.  |                  |      |     |                             |                                |
| 640013  | Mt. Haldane and Dublin Gulch map-areas  | Poole, WH        | CG   | CPM | Yk                          | 105 M/13;106 D/4               |
|         | Obj.: An investigation of the bedrock geology of map-area 105 M/13 and as much of 106 D/4 as is feasible, as an aid to economic development in Keno Hill mining camp. Publ.Sca. 1"–1 mi.  |                  |      |     |                             |                                |
| 640048* | Study of mineral collecting areas of interest to rockhounds and tourists  | Stenson, Mrs. AP | EGG  | M   | —<br>Yk, BC                 | , —                            |
|         | Obj.: To meet the needs of non-professional Canadian and foreign visitors for information on the accessibility, location, and nature of occurrences of minerals and rocks of interest to rockhounds.  |                  |      |     |                             |                                |
| 650010  | Operation Selwyn  | Blusson, SL      | CG   | CPM | Mack,<br>Yk, BC             | 105 A, H, I, P; 104 O;<br>95 D |
|         | Obj.: To establish the stratigraphic sequence and determine the nature of abrupt facies changes in lower Paleozoic rocks of western Mackenzie and Selwyn Mountains, and to study the relationship and distribution of formations that are host to large base-metal deposits, as a contribution to the economic development of the north. Publ.sca. 1" – 4 mi.   |                  |      |     |                             |                                |
| 650012  | Metallogenic study of the beryllium–tin province of the Cassiar batholith   | Mulligan, R      | EGG  | MD  | Yk<br>BC                    | 105 A, B; 104 O, P             |
|         | Obj.: To investigate occurrences of economic minerals, their relationship to the geological environment, and the distribution of specified elements in igneous and other rocks and in stream sediments of the area.   |                  |      |     |                             |                                |
| 650024* | Cambrian biostratigraphy of the Canadian Cordillera   | Fritz, WH        | ISPG | WP  | Mack, Yk<br>BC, Alta        | —                              |
|         | Obj.: To identify and describe Cambrian fossils from the Canadian Cordillera, ascertain their relative stratigraphic positions, and provide faunal correlations for their enclosing strata.   |                  |      |     |                             |                                |
| 650131* | Quaternary geology, Snag-Kluane Lake  | Rampton, V       | QRG  | RSP | Yk                          | 115 F E1/2, G, J, K<br>E1/2    |
|         | Obj.: To map, describe and explain the glacial deposits extending from the snout of Klutlan glacier to the limits of glaciation north of Snag, with particular reference to the development of geomorphic and other criteria for differentiating the deposits and landforms relating to the several glaciations known to have affected the area, in order to: (1) differentiate the deposits of the area according to the respective glacial stages and sub-stages during which they were deposited; and (2) develop a chronologic framework within which glacial deposits of adjacent parts of Yukon can be classified on a reconnaissance basis. Publ. sca. 1:125,000 |                  |      |     |                             |                                |

660002	Atlin Horst project	Monger, JWH	CG	CPM	Yk,BC	105 C,D; Pts 104 J,K,M,N
	Obj.: (1) To establish a reference section for late Palaeozoic rocks in northern British Columbia.(2) To determine relationships between Permian, pre-Permian and post-Permian rocks in this area.(3) To determine the structural style of these rocks in the 'Atlin Horst'.					
660020	Structural and palaeomagnetic fabric of the Mackenzie Arc	Norris, DK	ISPG	SG	Mack Yk	106;107;116;117
	Obj.: The role of the Mackenzie Arc in the depositional and structural history of the western Interior Plains and Mackenzie Mountains as it may have influenced the temporal and spatial relations of stratigraphic and structural traps in the area.					
670011	Study of a Tertiary caldera complex, Bennett Lake, B.C. and Yukon	(Lambert, MS)	CG	CPM	Yk BC	Pts 105 D/5; 104 M/14
	Obj.: To describe and interpret the petrography and structure of a circular volcanic complex and contribute to the understanding of volcanic processes in the Cordilleran region.					
670090*	Subsurface Upper Paleozoic stratigraphy, Northwest Territories	Martin, HL	ISPG	PS	Yk	95 A—G,K,L,M;105;106 B—F, K—M;115;116
	Obj.: (1) To provide geological information, particularly formational tops, as required by the Department of Indian Affairs and Northern Development for publication in their annual Schedule of Wells; and (2) to identify stratigraphically significant subdivisions of the interval; to determine their annual extent, thickness, lithologic character, structural configuration, and relationships to adjacent strata; to deduce the sequence of geologic events which produced them; to correlate the surface to subsurface stratigraphy; and to explain the relationships between porosity development and facies.					
670576*	Canadian Triassic Ammonoidea and Bivalvia	Tozer, ET	ISPG	WP	Frank, Yk BC,Alta	—
	Obj.: To describe and assess biochronological significance of Triassic Ammonoidea and Bivalvia in order to refine methods for dating Triassic rocks.					
680047*	Geomorphic processes, Mackenzie Valley — Arctic coast	(Mackay, JR Prof)	QRG	EGG	Mack Yk	Pts 85,95,96,97,107, 107,117
	Obj.: To describe, measure, and explain geomorphic features and processes related to permafrost, and to fluvial, lacustrine, coastal, eolian, and mass wasting activity in a permafrost environment.					
680068*	Mesozoic palynology and biostratigraphy, western and northern Canada	Hopkins, WS Jr	ISPG	WP	Frank Mack, Yk BC, Alta	—
	Obj.: Description of of microfloras from Mesozoic rocks, particularly the Sverdrup Basin. Establishment of sequence of floral zones necessary for biostratigraphic control in this region of active exploration for petroleum resources. Ultimately the project will allow description of floral evolution and migration through the Mesozoic and into the Tertiary.					
680093*	Devonian biostratigraphy, western and northern Canada	Pedder, AEH	ISPG	WP	Frank,Mack Yk,BC,Alta	—
	Obj.: Establishment and refinement of Devonian faunal sequences to allow correlation of Devonian rocks of western and northern Canada. The project will provide time control that will aid greatly the search for Devonian stratigraphic traps and thus assist the exploration of the natural resources of the Devonian rocks of the region.					

680118	MacMillan River (NTS 105; 115) map-area. 1:1 million Geological Atlas Program	Gabrielse, H	CG	CPM	Yk	105;115
	Obj.: To publish a modern compilation and synthesis of the geology of the map-area as a unit of a 1:1 million geological Atlas of Canada. More detailed objectives are as 1 April 1969 of File 116-6-4.					
680119	Operation Stewart	Blusson, S	CG	CPM	Mac, Yk	105N,O;106B,C
	Obj.: To outline and interpret the regional stratigraphy and structure in a previously unmapped part of the Selwyn basin and to relate these features to the search for mineral deposits analogous to the Keno Hill and Vangorda deposits on the west and south.					
690005*	Structural geology of northern Yukon Territory and northwestern District of Mackenzie	Norris, DK	ISPG	SG	Mack Yk	117 A-D; 107 B
	Obj.: Critical evaluation of the structural geometry of Richardson, Barn and British Mountains, intervening plateaux, and adjacent coastal plain for documentation of the nature, origin and mechanics of the deformation and its bearings on the hydrocarbon and mineral potential of the region					
690020*	Mesozoic-Tertiary stratigraphy and sedimentation — Beaufort-Mackenzie area	Yorath, CJ	ISPG	MS	Mack Yk	106 N;107;116 N;117
	Obj.: To determine the geological history of the Beaufort-Mackenzie basin; to provide geological data in order to assist in the establishment of proper conservation regulations; and to contribute to the realization of the economic potential of the area.					
690022	Petrographic study of particle types in coking coal charges	Cameron, AR	CG	CR	Yk,BC,Alta NB,NS	
	Obj.: To determine the effect of petrographic variation as expressed by microlithotypes or particle types on the coking behaviour of coals as charged to the coke oven as an aid in the evaluation of the coking coals of western Canada.					
690026	Petrographic correlation of coal seams at Carmacks, and evaluation of their coking properties	Hacquebard,PA	CG	CR	Yk	115 I/1
	Obj.: (1) Correlation of coal seams in order to determine extent of mineable coals in Carmacks area. (2) To predict coking properties from petrographic composition and rank determinations.					
690036*	Regional geochemical census of plu- tonic rocks in the eastern Yukon	Garrett, RG	EGG	G	Mack Yk	95 E; 105 A,G,H,I-P; 106 D
	Obj.: (1) To ascertain whether differences in geochemistry of these plutons can be used to distinguish those that have related deposits of W, Mo, Sn, Au, and Cu and those that do not. (2) To contribute chemical data on these rocks which may be used in interpreting their geological occurrence and correlation.					
690042*	Paleomagnetic studies of radio- metrically dated igneous rocks in the Cordillera	Symons, DTA	EG	RM	Yk BC	92;93;103
	Obj.: To establish a reliable paleomagnetic pole path with its reversal pattern and intensity variation from the Paleozoic to present for the Cordillera and thereby: (a) provide a reference for paleomagnetic dating of units of unknown age; (b) establish correlations between units; and (c) check for gross tectonic movements of the Cordillera relative to the rest of North America.					

690047*	Quaternary geology, Beaufort-Mackenzie	Rampton, V	QRG	RSP	Mack Yk	97 F;107 B-E; 117 A,C,D
	Obj.: To map and explain Quaternary deposits and landforms in order to: (1) establish their sequence and age and outline the history of preglacial, interglacial, glacial, and post-glacial events; and (2) provide areal and stratigraphic geological information including data applicable to permafrost and engineering studies and petroleum development. Publ. sca. 1:125,000 or 1:250,000					
690048	Soils in glaciated and unglaciated terrain	Rutter, NW	QRG	RSP	Yk	Pt 115 P
	Obj.: To characterize soils (pedology) in the central Yukon, with particular reference to the contrast between soils in glaciated and unglaciated regions; to develop a technique for differentiating soils developed <i>in situ</i> from those developed on transported material.					
690067*	Federal-Provincial Aeromagnetic Surveys – Yukon, N.W.T.	MacLaren, AS	EG	SP	Mack Yk	76 L,N;86 N1/4,A,B,C, E-L,M-P;105 M;106 C,D N1/2,E,F;116 A N1/2,B N1/2,N1/2F-H
	Obj.: To provide aeromagnetic maps to aid in mineral exploration and geological mapping; to lay down technical specifications and administer contracts with various geophysical companies; and to ensure that specifications are adhered to in order to produce aeromagnetic maps at scales of 1:63,360 and 1:253,440.					
700025*	Operation Snag-Yukon	Tempelman-Kluit, D	CG	CPM	Yk	105 0W1/3,115NE1/2, 115H,115KE1/2,pt115J
	Obj.: To provide geological information on the age, sequence, structure, relationships, thickness and origin of the bedrock formations and on the origin mode of occurrence and economic potential of the associated mineral deposits.					
700026	Cordilleran volcanic project	Souther, JG	CG	CPM	Yk,BC	115; 105; 104; 103; 93;92
	Obj.: To interpret data on volcanism on the Cordillera from other Survey projects and outside sources in order to advise and assist departmental geologists, other scientists and the public and industry with problems related to volcanology.					
700034	Devonian biostratigraphy of northern Yukon Territory and adjacent District of Mackenzie	Norris, AW	ISPG	PS	Mack Yk	106 W1/2; 116 E3/4; 117 S1/2
	Obj.: To include (a) delineation of facies distribution of Devonian rocks in area; (b) identification and determination of ranges of fossils for refining correlations with other areas, determination of the distribution of faunal provinces and paleogeography of Devonian seas; and obtainment of more information on the Upper Silurian and Lower Devonian, an interval particularly well represented in the southern part of the area.					
700064	Foraminiferal zonation of the Mesozoic and lower Cenozoic rocks of the Mackenzie delta and adjacent Arctic coastal plain	Chamney, TP	ISPG	WP	Mack, Yk	97 B,C,F;107 A-D; 117 A
	Obj.: Detailed biostratigraphic subdivision of the Mesozoic and lower Cenozoic rocks.					
700068*	Basin analysis of exposed Mesozoic and Tertiary strata in northern Yukon Territory in relation to the subsurface stratigraphy of Mackenzie delta-Beaufort Sea areas	Young, FG	ISPG	MS	Mack Yk	Pts 106 N1/2,107,116 N1/2,117



NP (7)	Terrain sensitivity map series — Northwest Territories and Yukon Territory	Owen, EB	QRG	EKG	Frank; Kee;Mack; Yk	—
	Obj.: To prepare terrain sensitivity maps by compilation of available data supplemented by airphoto interpretation in order to meet the requirements of the Northern Economic Development Branch, DIAND, for the implementation of land use regulations. Publ. sca. 1:500,000.					

Note: NP's 1-7— The number in brackets is not a project number but is only for identification in this text.

## INLAND WATERS BRANCH\*

### *Hydrologic Sciences Division*

#### **Responsibilities**

To provide and disseminate data on quantity and quality of Canadian lakes, rivers, aquifers, snow and ice; to develop new concepts and acquire new knowledge pertaining to the behaviour and occurrence of water in the hydrologic cycle; to provide advice to the federal government on technical aspects related to the management of interprovincial and international waters; to provide an economic basis for pollution control; to ensure appropriate use and conservation of Canada's fresh-water resources both quantitatively and qualitatively; to foster increased knowledge in the domain of water.

#### **Long-term Plans**

Through this division the branch plans to continue routine observations on selected Arctic basins and undertake a vigorous program to study the effects of pollutants in water within an Arctic environment. Climatological studies now in progress will be modified to emphasize the distribution of seasonal ice and the use of remote-sensing techniques.

New programs have been developed to focus on the changes that result from mineral exploration and oil exploration in regions dominated by the effects of snow or the formation of ice. These include depth measurements of glacier thickness and the state of the ice-bedrock interface. Increased attention is being given to the study of floating glacier tongues and iceberg production from calving glaciers.

#### **Review of 1970 Operations**

The Glaciology Subdivision continued glaciological studies on Per Ardua Glacier, Ellesmere Island, and on the Barnes Ice Cap and Decade Glacier, Baffin Island. Attention was given to the measurement of strain over a large portion of the icecap and a section of the margin carving into Generator Lake. A

program of terrestrial photogrammetry was continued on Axel Heiberg Island in cooperation with McGill University. In the Yukon Territory, movement studies of the Fox Glacier in the St. Elias Ranges were continued under contract with the Arctic Institute of North America.

In Ottawa, work continued on the Glacier Inventory of Canada to tabulate all Canadian Glaciers and provide data on area, altitude, orientation, volume, etc. Index maps have been prepared for the Arctic and 30 maps have been published at a scale of 1:500,000.

A study of the moisture flux pattern over the Eastern Arctic has been completed and a program has been initiated to determine precipitation over western regions. A project to determine the regime of Peter Lake in the Mackenzie Delta was continued.

The Glaciology Subdivision played an active part in the investigation of an oil spill at Deception Bay; a report with recommendations has been prepared as an internal publication.

#### **Plans for 1971**

Glaciological studies will continue on Per Ardua and Decade glaciers and on the Barnes Ice Cap with a concentration of field activities in the period May to August. The Barnes Ice Cap work will include studies of the glacier margins and the development of moraines. The Branch will cooperate in the study of Baffin Island-North Waters Project now under consideration.

The Glacier Inventory and climatological studies will continue as office projects in Ottawa, and a mathematical model of the Mackenzie River water flow and stream meander will be developed.

As a result of increased interest in the distribution of floating ice masses, a program has been initiated to study calving glaciers, and the first part of this project will include an assessment based on aerial photography.

In cooperation with the Water Science Subdivision, an extensive program has been proposed to study the effects of oil pollution in ice-infested waters. Two scientists have been recruited to investigate oil-water associations and the effects on ice formation, and a program will be developed to make tests under field conditions.

\*This branch was transferred in Nov. 1970, from the Department of Energy, Mines and Resources to the Department of Fisheries and Forestry.

*Water Quality Division.***Responsibilities**

This division operated an International Hydrological Decade (IHD) water quality network in the Yukon Territory and the Northwest Territories comprised of about 55 water sampling stations on surface waters. The objectives of the IHD network are: (1) to obtain base-line water quality data for industrial, municipal and private use; (2) to obtain base-line water quality data on which to set water quality standards; (3) to study water quality trends in Canada with a view to designing methods for forecasting water quality conditions; and (4) to support IHD activities in Canada and the world.

The division also operated, in cooperation with the Department of Indian Affairs and Northern Development, a pollution surveillance network at about 40 water quality sampling stations for the purpose of monitoring the effect of mine waste materials on public streams in the North.

**Long-term Plans**

Submissions to Cabinet are being prepared to increase the IHD water quality network in the Yukon Territory and the Northwest Territories to about 130 water sampling stations during the next three- or four-year period.

**Review of 1970 Operations**

About 300 water quality samples were collected and analyzed from the IHD water quality network and about 100 samples were analyzed in the pollution surveillance network. Water quality reports on the pollution surveillance programs were prepared and forwarded to the Department of Indian Affairs and Northern Development. Data from the IHD network were stored on magnetic tape in preparation for a water quality report to be prepared later.

**Plans for 1971**

Plans are under way to increase the IHD network by about 25 water sampling stations, and special detailed studies will be carried out in one or two mining areas to assess in depth the effect of mine wastes on the environment, particularly in the Pine Point area.

Consideration is being given to installing a water quality laboratory in the North, probably at Yellowknife, N.W.T., and to posting a small field staff in the area to carry out specialized sampling programs in connection with mine waste pollution problems and expanded network programs.

The division will be cooperating with the Environmental Quality Directorate, Fisheries Service, in a Mackenzie River Corridor Study to determine the effect of oil pipelines on the environment in the North. This is considered a combined research and survey program. It is anticipated the study will continue to almost 1980. In 1971, the Division expects to analyze about 650 water samples from this project.

*Water Survey of Canada***Responsibilities**

The Water Survey of Canada is primarily responsible for the collection, computation and publication of surface water data, including sediment data, for the major portion of Canada and works in close cooperation with the provincial governments and other departments of the federal government. In addition to the operation of a network of gauging stations for the above purpose, the Water Survey cooperates with other Divisions of the Inland Waters Branch in the collection of water samples for water quality analysis and the operation of observation wells for groundwater studies. It also operates, constructs and maintains water level recording stations to provide information on tides and water levels for the Marine Sciences Branch. To support its operational activities, the Water Survey of Canada carries out studies in hydrology and hydraulics, in instrument development and procedural methodology; operates a calibration facility for the rating of instrumentation used in its work; and operates laboratories for the analysis of sediment samples.

**Long-term Plans**

Close cooperation and consultation with the Department of Indian Affairs and Northern Development and systematic in-depth engineering studies of the changes required in the hydrometric network will set the pattern for planning of future water resources survey activities in the Territories. The Water Survey, through cooperative arrangements with the Marine Sciences Branch and the other Divisions of Inland Waters Branch, will continue to make observations of water levels for tidal and navigational purposes, of water quality, and of groundwater levels.

**Review of 1970 Operations**

The Water Survey of Canada operated its network of some 90 hydrometric gauging stations in the Yukon and Northwest Territories through offices at Whitehorse, Y.T., Fort Smith and Baker Lake, N.W.T., sub-offices of the British Columbia, Alberta and Manitoba districts respectively. Water quality samples were collected at some 50 locations and tides and water level records at 11. A program to collect sediment data got under way in the Yukon with the establishment of two stations. Stream flow activities involved measurements on the Melville Peninsula, Baffin, Cornwallis, Bathurst and Melville islands. Tidal installations were completed at Lake Harbour and Hall Beach.

**Plans for 1971**

Two new hydrometric stations are planned in cooperation with the Department of Indian Affairs and Northern Development. A program of improvements to existing stations will be continued involving addition of recording equipment and personnel shelters. A sub-office will be established at Inuvik to

improve data gathering in the Mackenzie River Basin. Several new tidal stations are planned in cooperation with Marine Sciences Branch of the Department of Energy, Mines and Resources.

## MARINE SCIENCES BRANCH\*

### Responsibilities

To carry out hydrographic and oceanographic surveys and studies in Arctic waters. To produce and distribute charts, sailing directions, tide tables, and reports based on survey activities and information from all sources.

To carry out physical and chemical studies of the Arctic marine environment to determine the circulation, wave regimes, tidal characteristics, properties and distribution of ice; and to develop mathematical simulation models on the behaviour and movements of ice and pollutants in the Arctic Archipelago.

### Long-term Plans

To complete standard hydrographic surveys of the Arctic coasts as soon as possible and to continue the publication and maintenance of up-to-date charts of the region. To carry out reconnaissance surveys where requirements exist for charting ahead of the regular surveys. To maintain reliable sailing directions as published in the *Pilot of Arctic Canada*. To publish tide tables to meet the needs of northern navigation and to carry out research to enhance our knowledge of tides in northern waters.

To gather and interpret data of the chemical and physical oceanographic and marine geophysical parameters with the object of understanding the environmental conditions and properties and the dynamic processes that effect the distribution of potential pollutants; and the advection and mixing of Arctic waters.

## Review of 1970 Operations

The Canadian Hydrographic Service carried out the following field activities during the 1970 season:

- In view of the intense interest by the oil industry in the Beaufort Sea area, a large proportion of the Canadian Hydrographic Service was allocated to this area.
- One hydrographer conducted reconnaissance and exploratory surveys throughout the Athabaska and Mackenzie Waterways.
- Advance prints of nine metric charts of the Beaufort Sea are now available as well as nine new strip charts of the Mackenzie River.

- The Division of Oceanography installed a permanent tide gauge at Franklin Bay as well as a wave gauging station at Herschel Island.
- The CSS *Richardson* was employed on a study of coastal circulation problems in the Amundsen Gulf between Herschel Island and Cape Bathurst. Geological and geophysical programs were run in conjunction with the physical oceanographic studies. The oceanographic and meteorological observations will be used in a mathematical model of the circulation of the Amundsen Gulf.
- The Frozen Sea Research Group had a field party of five men at the d'Iberville (formerly Greeley) Fiord Base for a six-week period starting in late February, 1970. Work was carried out following that begun in 1969. In addition, an oceanographic survey was carried out covering an area of 100 km west of the base.
- Laboratory studies of the phase-change process continued. The commitment to the design and development of instruments and support equipment to enable meaningful measurements in an Arctic winter environment remained unchanged at approximately 60% of the total effort.
- Some cooperative studies were undertaken in conjunction with oil interests based at Calgary, Alberta. These studies included discussions relating to ice pressure on structures and on environmental engineering.
- The Marine Geological Section of the Atlantic Region continued their 1969 program off the west coast of Banks Island over the Polar Shelf. Two students were hired and the work was carried out under the auspices of the Polar Continental Shelf Project.
- The northern portion of the cruise of the "HUDSON 70" began at Victoria, B.C. in August and terminated at Halifax in October. Essentially the work comprised ship-borne operations from CSS *Hudson* with the assistance of the crew and 26 scientists and technicians. All but four were full-time continuing employees of the department.
- Three deep-coring stations and vertical plankton hauls were carried out as work began in the Northwest Pacific. This was continued in the Beaufort Sea together with station work on one shift and underway work on another.
- The station work consisted of biological sampling, oceanographic sampling, current meter work, geological sampling of the seabed with grab samplers and corers, drilling and dredging stations and bottom photography.
- Continuous seismic-reflection profiling in shallow (about 1500 feet of strata), sea magnetics, surface gravity bathymetry and side-scan sonar were carried out under way.

\*This branch was transferred in Nov. 1970, from the Department of Energy, Mines and Resources to the Department of Fisheries and Forestry.

The above programs were carried on until the last week of September and then continued through the Northwest Passage to Resolute arriving there the first week of October. Other vessels assisted *Hudson* in these programs, namely the CSS *Baffin* which carried out underway gravity and magnetometer surveys as well as some geological sampling. CSS *Richardson* was used for shallow seismic profiling and for geological bottom sampling. CSS *Parizeau* provided some geophysical assistance and also provided geological sampling. The support vessels supplemented their crews by employing extra personnel, five for *Baffin*, three for *Parizeau* and three for *Richardson*. *Parizeau* and *Richardson* assisted for approximately eight weeks. *Baffin* was in the area prior to *Hudson's* arrival but both vessels left together for Resolute in company with MOT icebreaker support arriving there the last week of September.

The Atlantic Region participated in hydrographic projects in the Western Arctic, Beaufort Sea and Prince of Wales Strait by using the CSS *Baffin* which arrived in the working area from Halifax through the Panama Canal to Victoria and thence north, arriving there in late July. In addition to the support given *Hudson*, the *Baffin* carried out standard hydrographic charting operations utilizing five survey launches and one MOT helicopter on the following priority basis:

- 1) Two shoal areas discovered by CCGS *MacDonald* while accompanying the *Manhattan* in 1969 were examined and an extensive area of what appears to be underwater pingoes was delineated.
- 2) Standard charting of Prince of Wales Strait with emphasis on the area around Princess Royal Island was completed.
- 3) Coastal charting was accomplished to the twenty-fathom contour in the area east of Atkinson Point. The oil find at Atkinson Point focused interest on this area as well as proving of assistance to future navigation since the bathymetry along this coast is comparatively unknown.
- 4) In the Beaufort Sea west of Herschel Island, the *Baffin* ran a line of track soundings using Decca Lambda to the area covered by priority (1).

In addition to ship's officers and crew these surveys were supported by seven hydrographers, one geophysicist, one geophysics technician, one geologist, two electronic technicians, one helicopter pilot, one helicopter engineer, and two casual employees.

*Baffin* was equipped with a towed magnetometer, ship-borne gravimeter and Van Veen grab samplers. Geophysics personnel made continuous gravity and magnetic measurements and geological staff collected bottom samples throughout the survey area. Geophysical measurements were collected in conjunction with *Hudson* across the Northwest Passage and a short geophysical survey was completed in Baffin Bay.

CSS *Parizeau* from the Pacific Region and Polar Continental Shelf Project personnel engaged in similar charting programs in the Beaufort Sea at MacKenzie and Franklin Bays.

Two hydrographers from Atlantic Region joined a MOT icebreaker on Eastern Arctic patrol in July and remained until the close of the shipping season in October. Track soundings and reconnaissance soundings were completed in uncharted areas; namely, Douglas Harbour in Hudson Strait, Ege Bay in Foxe Basin, Parry Bay, Rocks Bay, Baffin Bay and Davis Strait. CSS *Louis St. Laurent* was used to establish control for a 1971 survey in Viscount Melville Sound.

Marine geophysics projects in the Western Arctic included gravity and magnetic surveying in conjunction with the hydrographic survey of the Beaufort Sea and Prince of Wales Strait. One technician and one geophysicist carried out this work. Three geophysics personnel were also aboard *Hudson* for gravity and magnetic measurements. This work involved underway measurements from Victoria, through the Western Arctic and the Northwest Passage to Resolute.

Geophysics personnel also completed underway geophysical and seismic measurements in the Baffin Bay area and on the return voyage to Halifax. *Hudson* and *Baffin* were both used in this work assisted by the USCGS *Edisto* acting as a shooting ship in the Baffin Bay area to complete the seismic refraction experiment. The experiment complemented work undertaken by Dalhousie University personnel aboard the CSS *Dawson*. With the exception of the US Coast Guard and Dalhousie University all personnel were employees of this department.

#### Plans for 1971

A party of six men from the Frozen Sea Research Group will carry out an oceanographic survey of d'Iberville Fiord from their base at Greely Fiord from March 1 to April 6, 1971. Studies will consist of heat flow through ice, currents under sea ice, and phase change in arctic seawater.

The Frozen Sea Research Group plans a study of water structure changes during freeze-up at Cambridge Bay from August 20 to October 31, 1971. Cambridge Bay will also be the site during December, 1971 of studies on seasonal water structure changes, convective circulations under ice as well as laboratory work on seawater phase changes and ice formation. The group will continue contacts with oil companies at previous levels.

The Atlantic Oceanographic Laboratory's Hydrographic Section proposes to carry out charting in the Eastern Arctic by two field establishments:

#### 1) Northwest Passage Survey

This will be basically the continuation of charting the Northwest Passage, specifically in the Viscount Melville Sound. It is hoped to utilize the CCGS *Louis St. Laurent*, if this program goes forward. Five hydrographers, six electronic technicians and three casual employees will make up the party. 12F Decca will be used for positioning, and two 31-foot survey launches will be carried in case ice conditions will allow their use to supplement the ship's work output. To date, the *Louis St. Laurent* has not been committed to this survey; however, the Ministry of Transport has the requirement under consideration.

## 2) *Eastern Arctic Surveys*

It is proposed to place three hydrographers on one of the MOT northern supply vessels to collect hydrographic data on an opportunity basis. The program for this has not been finalized to date. The only information available is that reconnaissance surveys will be carried out in Nansen Sound, Norwegian Bay, Jones Sound and other areas of the Eastern Arctic on an opportunity basis. No notification has been received regarding the vessel to be used in this operation.

The CSS *Parizeau* of the Pacific Region will undertake extensive sounding operations in the central Beaufort Sea area. A 70-foot vessel will also be chartered to survey various areas on the Mackenzie River between Port Providence up to and including the Mackenzie Delta. A temporary tide-gauging program will be carried out in the Beaufort Sea.

## THE MINERAL RESOURCES BRANCH

### Responsibilities

The Mineral Resources Branch of the Department of Energy, Mines and Resources undertakes mineral economic research and mineral policy development on a regional, national, and international basis, in the context of the national interest. Branch activities include mineral resources and economic development in northern Canada; specifically, the provision of advice on and participation in the policy-formulation, program-planning, and project-evaluation processes of the Department, interdepartmental committees, and other departments including the Department of Indian Affairs and Northern Development. The Branch also administers the Emergency Gold Mining Assistance Act and recommends on mineral matters under the Income Tax Act to the Department of National Revenue.

### Long-term Plans

To continue to advise on, participate in, and undertake federal government programs and activities that are related, wholly or in part, to mineral resource utilization and northern economic development.

### Review of 1970 Operations

The Mineral Resources Branch continued as adviser to the Department of Indian Affairs and Northern Development and as participant in interdepartmental activities concerned with northern economic development. Previous special studies concerned with regional economic mineral appraisals, mineral industry development opportunities, and possible infrastructure investment requirements were reassessed as changing circumstances developed.

During the first half of 1970, work continued toward the completion of the Yukon and Northwest Territories sections of the National Mineral Inventory. This phase of the program was essentially completed by mid-year and the results made

available to the Northern Economic Development Branch in Ottawa and to the resident geologists at Whitehorse and Yellowknife. This project is to some extent a continuing one in that additions or deletions are made necessary as the results of new geological or other types of survey become available. Therefore, there is a requirement to update the inventory, from time to time. Work on this began late in 1970 and is being continued into the new year.

As a member of the Interdepartmental Advisory Committee on Northern Development, the Interdepartmental Committee on Northern Roads, the Interdepartmental Committee on Pacific Coast Transportation, the Branch was involved in various economic mineral potential appraisals related, for example, to implementation of the 10-year, \$100 million northern roads program.

Reports by mineral economists were also provided on mineral property evaluations and field investigations to northern mineral establishments. Program planning and research were continued on a major comprehensive interdepartmental study relative to economic development and transportation requirements in northern British Columbia and the Yukon. The Department's responsibility for national energy policies requires particular attention to petroleum developments in the Arctic; this involves the Branch as a participant in departmental and interdepartmental task forces.

The Branch administers the Emergency Gold Mining Assistance Act, a national program introduced in 1948 to provide financial assistance to marginal gold mines encountering rising production costs under a fixed international price and to allow a more orderly adjustment of dependent communities. Field inspections were made to placer-gold and lode-gold operations in the northern territories. Approximately \$1,800,000 was payable to five lode mines in the Northwest Territories and \$15,000 payable to 12 placer operators in the Yukon for 1970. The Branch also provides advice to the Department of National Revenue with respect to tax benefits (i.e., three-year tax exemption, depreciation, and depletion) under the Income Tax Act. Field investigations, when necessary, are made for this purpose and recommendations were made with respect to 14 mining operations in Canada, one of which was in the Territories. The Branch also continued a study of the proposed new Yukon Minerals Act.

Branch involvement in mineral economic research and mineral policy development at the regional, national, and international level is such that mineral industry corporations and related institutions seek advice on economic, technical, and administrative matters concerned with operating in the north.

### Plans for 1971

The Mineral Resources Branch will continue to undertake mineral economic studies and develop policy recommendations to facilitate northern economic development as an adviser to the Department of Indian Affairs and Northern Development, as a participant in related interdepartmental committees and task forces, as administrators of the

Emergency Gold Mining Assistance Act, and as adviser to other departments such as the Department of National Revenue.

Specific studies still under way or initiated in 1971 concern: economic development and transportation requirements in northern British Columbia and the Yukon; policy problems and alternatives in declining mineral-based regions; development of an overall northern development strategy; and transportation requirements along the Mackenzie valley.

In addition to regular field investigations and inspections, Branch officers participate in conferences concerned with mineral economics and northern development.

## **MINES BRANCH**

### **Responsibilities**

Technical assistance for the development of mining and metallurgical industries in the North and for the development and utilization of petroleum and natural gas resources. Consulting advice and investigations on metals, metallic and non-metallic minerals, fuels, petroleum, and natural gas as related to northern development.

### **Long-term Plans**

To continue technical assistance in developing mineral, petroleum, and natural gas resources in cooperation with industry, the Department of Indian Affairs and Northern Development, and other departments of government.

### **Review of 1970 Operations**

#### **Metallic Ores**

##### *Silver-Lead-Zinc-Copper Ore from Parrie Creek, N.W.T.*

At the mining company's request, investigation of the high-oxide ore sample was suspended to carry out an investigation on a sample of sulphide ore which contained 9.51 oz silver per ton, 15.62 per cent lead, 29.60 per cent zinc and 1.00 per cent copper. By flotation, saleable concentrates were produced from this ore with reasonably good recoveries.

This investigation of the sulphide ore is considered complete but some additional test work on the oxide ore will be carried out in an attempt to produce better grades and recovery of the zinc.

#### **Other Minerals**

A petrographic study of various rocks submitted by the Territorial Relations Board of Indian Affairs and Northern Development was continued. In addition to rock, carvings and handicrafts from wood, leather, whale bone, tusks from seal, and buttons cut from reindeer horns are being investigated.

It has been shown that calcite and scheelite from the Northwest Territories can be separated by flotation. Difficulties with a method for analyzing  $\text{WO}_3$  have been resolved and an improved flotation system is being developed.

## **Extraction Metallurgy**

Several of the Mines Branch programs under way in the field of extraction metallurgy will be of benefit to the mining and metallurgical industry of the North. These programs include simplified processes for uranium recovery and hydro-metallurgical processes for treatment of base metal sulphide ores. Studies are being made of mathematical models of beneficiation processes which will facilitate optimization of process control. Applied research in the control of the quality of water discharged from metallurgical operations is being carried out.

As in previous years, the Mines Branch has provided technical information services to the northern mining industry. This has been carried out by direct communication and by supporting cooperative organizations devoted to information exchange, such as the Canadian Mineral Processors, the Canadian Uranium Producers' Metallurgical Committee, and the Canadian Mineral Analysts.

### **Mineral Sciences**

As a result of pilot plant operations by the Mineral Processing Division and field work by the Geological Survey of Canada, the following analyses were carried out by the Analytical Chemistry Section of the Mineral Sciences Division:

- Cadillac Exploration — 219 determinations were made on 99 samples for copper, lead, zinc and silver.
- Mount Nansen Mines — 143 determinations were made on 46 samples for gold, silver, arsenic, antimony, total sulphur, soluble iron and insolubles.
- Arctic Gold — 50 determinations on 22 samples were conducted for nickel, iron, sulphur and insolubles.
- Geological Survey of Canada — 54 determinations on 43 samples were conducted for copper, gold and silver.

### **Fuels Research**

The chemical analyses conducted by the Fuels Research Centre to aid the mineral industry of the North consisted of the analyses of three mine air samples for New Imperial Mines Limited, Yellowknife, and three for Pennaroya Canada Limited, Prairie Creek, N.W.T., as part of the program to increase the safety of mining in Canada.

Research on the mineral matter distribution in the macerals of Tantalus Butte coal was continued, but the principal effort made during the year was to assist Norman H. Ursel Associates Limited in the exploration for coking coal in the Carmacks area. One aspect of this coal, which is of special interest, is that certain areas have had the rank of the coal elevated by heat derived from a lava flow. The approximate limit for the maximum temperature to which the coal was heated was deduced and this value is being checked by other indices of metamorphic development.

### **Effects of Processing and Forming on the Strength and Toughness of Structural Steels**

The study of the effect of mill-processing variables in the rolling operation on the properties of CSA G40.8 Grade B steel plate has continued. The required conditions of soaking temperature and time, pass reduction and cooling rate to give the optimum combination of strength and low-temperature toughness have been determined, and the properties obtained have been correlated with the microstructure.

The effects of forming are being investigated using three low-alloy steels of Canadian manufacture. The steels, in the as-rolled and in the normalized condition, are subjected to various degrees of strain aging, covering the range of practical interest, and the amount of embrittlement is being evaluated by the upward shift in the impact transition temperature.

Basic research is continuing on the effects of titanium and zirconium on the notch-toughness of low alloy steels, and the influence of melting conditions, in particular the deoxidation practice, on the short transverse ductility of several structural steels is being examined.

### **Fracture Toughness and Environmental Cracking Resistance of Medium- and High-Strength Steels**

Low-stress brittle fractures in steels are particularly prevalent at low ambient temperatures, such as prevail in the Yukon and Northwest Territories. A knowledge of the engineering and metallurgical parameters governing the incidence of such fracture is essential to the effective utilization of steels in load-bearing structures. Work is in progress on a broad spectrum of commercial steels, covering the tensile strength range from 80 to 250 kpsi.

Earlier research showed how static load failures could occur from small defects and how the minimum defect size could be calculated from the dynamic toughness. A method for the direct determination of the dynamic toughness has been developed and a structural steel, in various plate thicknesses, is being evaluated.

Further advances have been made in the application of fracture mechanics theory to high-strength steels. A hypothesis based on a relationship between elasticity and plasticity, proposed to explain the geometry of fracture, was supported by preliminary experimental data. This should broaden the range of materials and section sizes that can be qualitatively characterized.

The environment, particularly that of a marine atmosphere, can have a marked accelerating effect on the rate of sub-critical crack growth in the higher strength steels and result in sudden and premature failure. The effect of a salt solution on the nominal fracture toughness of several such steels is being studied and possible methods of minimizing the effect examined.

Work within the branch has continued on the development of wrought and cast high-strength steels, maximum toughness being a prime consideration. The wrought steels are of the martensitic, stainless, maraging type, with beryllium as the age-hardening constituent. The cast steels are air-hardening and

self-tempering nickel-cobalt and nickel-chromium-molybdenum alloys. In both cases, alloys having sufficient potential to merit more intensive study have been produced.

### **Toughness Characteristics of Low-Maintenance Steel Structures**

The desirability of reducing the degree of maintenance to the lowest practical level for steel structures in the North is of obvious importance. Weathering steels, which develop a protective oxide coat in service are, therefore, of special interest. Research is in progress to examine the characteristics of such steels and to endeavour to improve their properties by modifications to the chemical composition. Phosphorus is an important element as regards the corrosion resistance of such steels, and results to date indicate that higher levels of phosphorus than normally considered advisable can be utilized with no sacrifice in low-temperature toughness.

An alternative and more common method of protection for large steel structures is that of galvanizing. Three structural steels have now been subjected to welding, acid pickling and galvanizing, prior to mechanical testing and metallurgical examination. The results confirmed that there was no significant embrittlement and that this combination of processes can be used with a satisfactory margin of safety.

### **Welding of Steel for Low-Temperature Applications**

This activity is being carried on with the direct interest and cooperation of the National Energy Board and with particular respect to steel pipe for use in oil and natural gas transmission lines. The results of in-house studies of welding practices and the assessment of weldability have been utilized frequently to analyze pipeline failures, to minimize their occurrence, and to provide advice and consultation to the National Emergency Board, industrial organizations and specification committees.

A comparison of the low-temperature notch-ductility of weldments in CSA G40.8 Grade B structural steel plate is in progress. The welds are being made by five standard processes and their notch ductility evaluated by means of small-scale and full-plate thickness tests.

### **Casting Alloys for Ice-breaker Propellers**

The mechanical properties of a chromium-nickel steel were determined as part of an assessment of its potential as an ice-breaker propeller casting material at a strength level of 115 kpsi. The notch toughness, as measured by small- and large-scale tests, remained at a high level down to very low temperatures, indicating good resistance to impact damage. The microstructure of the casting was also satisfactory.

### **Plans for 1971**

Research will continue on the major projects outlined above and will be coordinated within the program on metals and alloys for Arctic use. A new program will involve the development of a higher-strength pipeline steel with improved weldability and low-temperature toughness for the construction of gas and oil lines of greater integrity than hitherto

achieved. Low-cycle fatigue studies of high-strength steels at low temperatures will be initiated and the potential of certain non-ferrous alloys for structural applications in the North will be investigated. Advice and consultation will continue to be provided to the National Energy Board.

## POLAR CONTINENTAL SHELF PROJECT

### Responsibilities

To carry out a long-term investigation of the continental shelf region lying north of the mainland of Canada and north and west of the Canadian Arctic Archipelago, including the sea floor and the Earth's crust and mantle beneath it, and the waters above it; together with the islands of the archipelago, the straits and sounds between the islands, and the adjacent mainland where relevant. The investigations comprise mainly those fields of survey and research for which the Department of Energy, Mines and Resources is responsible in other parts of Canada, wherever such study is not more economically and efficiently pursued as a separate self-contained operation. It is also designed to include or to support worthwhile researches in fields outside those normally undertaken by the Department if such researches are in the national interest and could not otherwise be undertaken. An important function of the Project is to coordinate and to arrange for mutual or concerted action by various agencies whose diverse specialties or capabilities can be brought to bear on different but related aspects of a major Arctic problem or critical area of study. It also provides continuity of planning and operation for various studies whose separate activities are short-term and focused on individual problems. Emphasis is placed on field research and survey, but basic laboratory or theoretical research is carried on as needed to aid in the investigations, or in the interpretation of field data; and equipment or technique development or experimentation is undertaken as relevant. In addition, the field facilities of the Project are made available, under certain conditions, to approved university and other non-government research groups.

### Long-term Plans

The field survey and research activities will eventually cover all the Canadian sector of the Arctic continental shelf of North America, those parts of the Arctic Ocean basin that are of interest to Canada, and those parts of the Arctic Archipelago and arctic mainland not investigated by other agencies in the fields of interest to the Department of Energy, Mines and Resources. It is intended that the program coordinating and logistics support functions of the Project shall be made available, where appropriate and approved, to scientific activities in any part of Arctic Canada or the adjacent oceans of interest to the government of Canada.

### Review of 1970 Operations

Major field activities were carried out from mid-February to early October and were co-ordinated mainly from Tuktoyaktuk on Kugmallit Bay and from Resolute on Cornwallis Island.

A smaller program of sea-ice investigations was undertaken in January, February and December.

About half of the investigations were concentrated in the Mackenzie delta-Beaufort Sea area. Other studies ranged from Amundsen Gulf to Baffin Bay and to Robeson Channel on the northeastern side of Ellesmere Island.

In addition to the Department of Energy, Mines and Resources, the following agencies were involved in or received assistance from the 1970 program of the Polar Continental Shelf Project:

Department of Public Works  
 Department of National Defence  
 Department of Indian Affairs and Northern Development  
 National Museums of Canada  
 National Research Council — Canadian Committee for the International Biological Program  
 Arctic Institute of North America  
 McGill University  
 University of Ottawa  
 University of Calgary  
 Brock University  
 Quebec Department of Tourism, Fish and Game  
 University of Washington  
 University of Hokkaido, Japan  
 University of Heidelberg, Germany  
 Cold Region Research and Engineering Lab., U.S. Army.

The following is a summary of the work done in 1970 in the major scientific fields:

- *Geology, Marine:* Mackenzie River delta and Beaufort Sea

A continuing study, carried out in co-operation with Bedford Institute and the Institute of Sedimentary and Petroleum Geology of the Geological Survey of Canada, of the geology of the sediments, the processes of sedimentation, and the present and fossil organisms of the sea floor in an Arctic delta and continental shelf environment. Special attention is being given to the regional and local structures in the sediments of the Mackenzie delta area and the submerged part of the Arctic coastal plain.

In 1970, marine geological work in the Beaufort Sea was also undertaken as part of the circum-Americas cruise of C.G.S. *Hudson*. Core samples of the bottom sediments, and geophysical information were obtained in the area of Herschel Submarine Canyon and along the outer part of the Mackenzie River delta and continental shelf. Limited geological information was also obtained from the sea floor at intervals along the Northwest Passage and in northern Baffin Bay.

- *Geology, terrestrial; palaeontology and stratigraphy:* Lower Mackenzie River valley; Mackenzie delta; Banks Island; central Arctic archipelago.

Continuing detailed studies by the Geological Survey of Canada, supported by the Polar Continental Shelf Project, of Palaeozoic, Mesozoic and Cenozoic formations in selected locations. The work is directed toward obtaining a better understanding of the geological characteristics and history of areas of high economic potential, and of the terrain problems that may be encountered or guarded against if industrial activities are undertaken.

- *Geology, terrestrial; geomorphology and Quaternary geology*: Mackenzie River delta; Banks Island; Ellesmere and Devon Islands.

A series of continuing studies by the Geological Survey of Canada with the co-operation of several universities, of the nature and distribution of permafrost in the Mackenzie River delta area, of the mechanics and development of permafrost land forms, with special reference to the development of pingoes and the occurrence of permafrost around and under lakes, the seashore, and offshore, of the evolution of land forms on Tertiary formations of the coastal plain and on the coasts of the eastern Queen Elizabeth Islands, of the recent geological history of the Beaufort Sea and archipelago with special attention to changes of sea level and the history of glaciation.

- *Geology, geochemistry*: Mackenzie River delta area.  
A study by the University of Calgary, supported by the Geological Survey of Canada and the Polar Continental Shelf Project, of the chemical changes of the fresh water of the Mackenzie River entering the Arctic Ocean and their effect on the transported and deposited sediments.
- *Geology, geophysics; permafrost investigations*: Mackenzie River delta region.  
An experimental study of the use of "shallow seismic" and resistivity techniques to investigate the occurrence, depth, and thickness of permafrost in different local geological settings.
- *Glaciology, Climatology*: Meighen icecap, Meighen Island.  
A continuing study of the behaviour of a small Arctic icecap and its influence on and reactions to the local climate, with emphasis on the energy exchange between the atmosphere and the Earth's surface.
- *Glacier Physics*: Meighen icecap; Melville Island icecaps.  
Continuing studies of the mass balance and physical behaviour of small Arctic icecaps to determine the volume, thermal, and dynamic relationships of ice masses in a high Arctic environment. The crystallography and internal structure of the Meighen icecap is being studied to determine its history and the climate during the recent geological past.

- *Gravity; regional surveys*: Beaufort Sea area.

Regional mapping of gravity by the Earth Physics Branch with support from the Polar Continental Shelf Project, as part of the gravity survey of Canada. In 1970, approximately 1,550 gravity stations were observed in an area of more than 100,000 sq. km., for mapping on a scale of 1:500,000.

- *Gravity; interpretation*: Arctic archipelago and Arctic Ocean.

Bouguer anomaly maps of the northern Arctic archipelago and adjacent ocean have been compiled on scales of 1:1,000,000 and 1:500,000 and interpretive models of crustal structure have been developed.

- *Heat flow*: Ellesmere Island; Northwest Passage.

Measurements of the flow of geothermal heat from the Earth's crust, by the Earth Physics Branch in co-operation with the Polar Continental Shelf Project, are undertaken in drill holes at the bottom of thermally stable lakes and in the sediments on the ocean floor. In 1970, information was obtained from the Tanquary Fiord area of Ellesmere Island, from drill holes in the western archipelago, and on part of the transit of the Northwest Passage by C.G.S. *Hudson*.

- *Hydrography*: Beaufort Sea.

Bathymetric survey, for charting at a scale of 1:500,000 by sounding through the ice at intervals of approximately 6 kilometers, with positions controlled by a Decca Lambda system. In 1970, approximately 1,100 soundings were taken, covering an area of about 90,000 sq. km over the continental shelf and the southeastern edge of the Canada Basin.

- *Hydrography*: inshore waters of western Arctic.

Hydrographic survey for charting at a scale of 1:75,000 by continuous profile sounding in Franklin Bay using an SRN-6 hovercraft as the sounding vessel and Motorola RPS positioning. In 1970, approximately 2,700 sq. kms. were charted on this scale and a smaller area at the mouth of Horton River surveyed in greater detail as a contribution to a feasibility study for Arctic tanker terminals being co-ordinated by the Department of Public Works. Hydrographic surveys undertaken from ships in western Arctic waters were carried out by the Canadian Hydrographic Service with liaison and assistance by the Polar Continental Shelf Project, and included areas in the vicinity of Mackenzie Bay charted by C.S.S. *Parizeau*, and surveys north of Atkinson Point and in the Prince of Wales strait charted by C.S.S. *Baffin*.

- *Marine Biology*: Beaufort Sea, Amundsen Gulf.

Studies of marine botany in zooplankton by the Museum of Natural Sciences, with support from the Polar Continental Shelf Project, to survey the populations and

distribution of species and add to knowledge of the marine ecology of Arctic Canada. In 1970, surveys were conducted along the coasts of the Beaufort Sea, Prince of Wales Strait, Amundsen Gulf and Dolphin and Union Straits.

• *Oceanography*: Beaufort Sea; Greely Fiord

A pilot study in preparation for the Arctic Ice Dynamics Joint Experiment (AIDJEX) was carried out in the sea ice of Beaufort Sea. The purposes were to test instruments and techniques for measuring absolute and differential water velocity profiles under freely drifting pack ice, to determine ice strain and deformation, to observe and map the undersurface of drifting ice, and to determine the differential translation of separated points on the drifting ice under different wind conditions. An associated part of this pilot experiment, the testing of methods for determining the tilt of the ocean surface, was also carried out by the Polar Continental Shelf Project on the ice of the Gulf of St. Lawrence in preparation for future studies on the Arctic Ocean. Oceanographic observations were also taken in late summer in southern Beaufort Sea during the passage of C.G.S. *Hudson*.

The Polar Continental Shelf Project provided liaison and logistics assistance to an Arctic oceanography program of the Frozen Sea Research Group of the Marine Sciences Branch in the fiords of central Ellesmere Island.

• *Photogrammetry*: Axel Heiberg Island.

An experimental survey of the lower part of White Glacier, Axel Heiberg was carried out in co-operation with the Inland Waters Branch to test the applicability of photogrammetric methods for the measurement of mass balance and movement of Arctic glaciers.

• *Sea Ice Surveys*: Arctic archipelago, Arctic Ocean

A systematic aerial survey of the distribution, nature and movement of sea ice in all the main channels of the archipelago and in the adjacent Beaufort Sea and Arctic Ocean. The 1970 survey was the 10th successive year of this operation; flights were carried out from mid-March until late October, covering the entire area about once every three weeks during summer and autumn. Additional reconnaissance observations were made of Beaufort Sea during the winter months.

• *Sea Ice Dynamics studies*: Kugmallit Bay

A continuing study is underway of the stress and strain relationships of the annual sea ice in Kugmallit Bay near Tuktoyaktuk and immediately offshore from the Mackenzie River delta to determine the forces generated in the ice by temperature changes, wind, and other factors. Measurements in 1970 established the movement along the eastern side of the bay and across its mouth from early winter until break-up.

A related study near Tuktoyaktuk obtained measurements of the stress in unbroken sea ice near shore under late spring conditions.

Support was also provided for:

- studies of underwater sound generation and propagation beneath various types of sea ice in Parry Channel and Nares Strait;
- tests of the performance and tracking of sono-drift buoys deployed on the sea ice of M'Clure Strait;
- a continuing comprehensive biological and ethological investigation on Barthurst Island;
- biological studies of the Truelove Lowland of northern Devon Island, part of the Tundra PT project of the International Biological Program, with emphasis on the energy flow through the biological community and on the effects of perturbations of the Arctic ecosystems;
- a study of the distribution and nesting habits of Greater Snow Geese in northern Baffin Island, Devon Island and Ellesmere Island;
- archaeological studies in the Mackenzie delta region, Anderson River, and on Banks Island;
- a multi-disciplinary study of the glaciers and glacial environment in Axel Heiberg Island;
- a study of the change of albedo and radiation from a melting sea-ice cover in the Beaufort Sea;
- a study of the form and structure of pressure ridges in the sea ice of southern Beaufort Sea;
- tidal observations at selected sites in the Arctic archipelago;
- measurements of the wind velocity profile over pack ice;
- studies of clay-mineral composition in different pelitic rocks of the Arctic Islands and Beaufort Sea area;
- recording, through artists' paintings, of important historic sites in the archipelago and northern mainland.
- studies of seismic lines and other disturbed areas in the Mackenzie delta district to determine the mechanism of disturbance of tundra vegetation and its rate of recovery;
- studies of waterfowl nesting sites and the effect on them of recent industrial activities;
- a study of coastline and landform development and the processes of beach formation, on Devon and Cornwallis Islands;
- systematic observations of surface weather in the Mackenzie River delta—Beaufort Sea region.

### Plans for 1971

The 1971 program will mainly be a continuation of that of 1970. The main emphasis for regional and systematic surveys will again be placed in the Beaufort Sea area. Hydrographic surveys and both regional and special studies of sea ice will receive special attention, in anticipation of the demand for information relevant to transportation and resource development in that region. There will be continued and increasing emphasis on the studies of terrain and the physical environment, its behaviour when disturbed, and the potential effects of pipeline on road development and the growth of communities. In addition to the work in the Beaufort Sea and lower Mackenzie River area, which will be carried out mainly from the base at Tuktoyaktuk, studies will be continued throughout the archipelago, co-ordinated from Resolute. The glaciological and climatological work on Meighen Island, and on Melville Island will be continued through 1971, and it is hoped that the major biological program on Bathurst Island, where studies continued through the 1970-71 winter, can be continued. Support of the High Arctic studies of the International Biological Program will be continued. Preparation for the Arctic Ice Dynamics Joint Experiment (AIDJEX), whose main program is scheduled for 1973-74, is continuing and a major pilot study is planned for the Beaufort Sea in 1971.

It is expected that the 1971 field program will engage a total of about 200 persons, including personnel under contract and crews of supporting aircraft. Aerial transport in the field, will be provided by one Bell 204B helicopter, one Bell 205A helicopter, two Bell 47G4 helicopters, one de Havilland DHC-3 Otter, one de Havilland DHC-6 Otter, one Beechcraft D-18S and one Bristol 170 Freighter aircraft.

Ground transport includes seven wheeled or tracked vehicles and about 15 motor toboggans and small amphibious vehicles. The offshore studies will be co-ordinated with C.S.S. *Parizeau*, and other vessels, as appropriate. In addition to the base camp at Tuktoyaktuk and the facilities at Resolute, the 1971 program requires that the Polar Continental Shelf Project operate camps at Herschel Island, Hooper Island, Atkinson Point, Meighen Island, Melville Island, Bathurst Island and a camp on the ice of Beaufort Sea. It is expected that the Polar Continental Shelf Project base at Alert may be reactivated for a brief period.

### POLICY RESEARCH AND COORDINATION BRANCH\*

#### Responsibilities

To develop, recommend and promote national and international strategies, policies and programs to improve the management and use of inland and marine waters, renewable resources and the quality of the environment.

\*This branch was transferred in Nov. 1970, from the Department of Energy, Mines and Resources to the Department of Fisheries and Forestry.

### Long-term Plans

To proceed with an orderly fulfillment of the responsibilities cited above which include specific consideration of inland and marine waters, renewable resources, and environmental quality in Canada's northern regions.

#### Review of 1970 Operations

Under the ambit of the Interdepartmental Committee on Water, Northern Water Programs Sub-committee co-ordinated the review and evaluation of northern waters and related resources programs.

### Plans for 1971

- Continuation of co-ordinating responsibilities under ICW, Northern Water Programs Sub-committee.
- Establishment of a consultative committee under authority of the Canada Water Act, for northern waters and related resources.
- Development of policy advice respecting northern marine waters.

### SURVEYS AND MAPPING BRANCH

#### *Geodetic Survey of Canada*

#### Responsibilities

The responsibility of the Geodetic Survey in the north is to provide a framework of precise horizontal and vertical control which serves as a basis for lower-order surveys which may be carried out by other government agencies or by private enterprise. These precise surveys also provide basic information for research in the solid earth science. The Geodetic Survey is also responsible for surveys to provide control for the 1/50,000 mapping program and for special surveys as required for the development work of other government agencies.

#### Long-term Plans

The long-term plans for northern operations include the extension and densification of the precise horizontal and vertical control framework and the provision of control for 1/50,000 mapping in those areas which are still unmapped at that scale. Aerodist operations will be continued in northern Saskatchewan, northern Manitoba and northern Ontario.

#### Review of 1970 Operations

Aerodist operations established 22 new first-order and 10 second-order stations in two blocks along the Arctic coast. The western block extended from the 1969 Aerodist work along the Yukon-N.W.T. boundary to the Alaska boundary. The eastern block extended from the eastern edge of the 1969 Aerodist work to the vicinity of Coppermine.

At Hay River, N.W.T. a destroyed first-order horizontal control station was replaced, a second-order traverse was run from Hay River to Enterprise to control legal surveys in the area, and a small amount of mapping control was established in the immediate vicinity.

In the Baker Lake-Padlei area of the District of Keewatin, 800 miles of third-order traversing was carried out to provide horizontal control for 1/50,000 mapping. Fifty-nine new stations were established and numerous connections were made to the existing third-order traverse network to provide information for a readjustment of the horizontal control in the area.

In Whitehorse, Y.T., and Cambridge Bay, N.W.T., the satellite triangulation stations were reactivated in October. These stations are manned by teams made up of both Canadian and American personnel. This work is part of the final stages of the Joint Canada-United States North American Satellite Triangulation Densification Program. It is expected that the work at these two sites will be completed by the end of March, 1971.

The precise levelling project near Thompson, Manitoba, was not completed. Ninety miles of levels were established and the remaining 10 miles will be completed in February, 1971.

#### **Plans for 1971**

Aerodist operations will establish a belt of horizontal control across northern Manitoba from the Manitoba-Ontario boundary near Island Lake to the Manitoba-Saskatchewan in the vicinity of Lynn Lake and in northern Saskatchewan from the 57th parallel north to the Saskatchewan-N.W.T. boundary. Aerodist photo control for 1/50,000 mapping will be established in the course of the work.

In the Yukon Territory horizontal, vertical and mapping control will be established in a 16,000 square mile block extending east from the Yukon-Alaska boundary in the Peel River area.

In the Northwest Territories, horizontal, vertical and mapping control is proposed for a 50,000 square mile block lying between the 112th and 120th meridians and the 64th and 67th parallels, east and south of Great Bear Lake.

At Frobisher Bay, N.W.T. the satellite triangulation station will be reoccupied in October in the final phase of the Joint Canada-U.S. Satellite Program.

In Quebec, mapping control operations will be carried out in two areas; south and west of Mistassini Lake, and south of the 52nd parallel between the 58th and 62nd meridians.

In Labrador and Quebec vertical control for 1/50,000 mapping will be established in a large area lying between the 52nd and 56th parallels and between the Atlantic coast and the 66th meridian.

In northern British Columbia, a precise level line will be started south from Watson Lake towards Stewart.

#### *Legal Surveys*

##### **Responsibilities**

To manage and execute surveys to enable land or resource transactions involved in the administration and development of public or other lands.

##### **Long-term Plans**

The long-term plans of this Division are dependent upon the planning and development programs of other government departments, mainly that of Indian Affairs and Northern Development. It is planned to carry out subdivision surveys in settlements in the North. The amount of work each year is determined by the development of these settlements by the Department of Indian Affairs and Northern Development. Similarly surveys of group lots, camp sites, and other parcels will be made as highway development is undertaken by the Territorial Governments. In the northern parts of the western provinces the development of existing Indian reserves and the setting up of new ones result in further work for the Division. Laying out lots for airstrips, navigational aids, etc., have been and will be carried out in conjunction with the Ministry of Transport. It is intended to establish Co-ordinate Control Surveys in the major settlements of the North. The legal survey involvement in the development of offshore resources requires research and study of methods in this connection.

#### **Review of 1970 Operations**

##### *Yukon Territory*

The Whitehorse co-ordinate Survey Area was extended into the MacRae and Porter Creek areas by the establishment of 44 new 3rd-order control monuments. The existing network was inspected, resulting in 28 monuments being rebuilt and reobserved. Reference bars were placed for 101 control monuments in the network.

A 54-lot subdivision was surveyed near Watson Lake for cottage lots.

A total of 15 parcels of land was surveyed in Whitehorse, MacRae, Burwash Landing, Ethel Lake, Magundy River, MacGregor Creek and Little Salmon River.

Surveys to locate non-directional radio beacon sites for the Ministry of Transport were made at Whitehorse, MacRae and Robinson.

Seven miles of relocated portions of the Alaska Highway near Whitehorse were surveyed.

An inspection survey of a subdivision in Whitehorse was carried out as part of the Division's inspection program.

##### *Northwest Territories*

Subdivision surveys were executed by staff surveyors at Fort Providence (77 lots), Chesterfield Inlet (67 lots), Repulse Bay (74 lots), Frobisher Bay (168 lots), Arctic Bay (82 lots), Pond Inlet (45 lots), Igloodik (101 lots) and Hall Beach (53 lots). A total of 19 parcels of land was surveyed at Inuvik, Norman Wells, Fort McPherson, Fort Smith, Yellowknife and

various locations along the highway system. Surveys to locate non-directional radio beacon sites for the Ministry of Transport were made at Repulse Bay and Chesterfield Inlet.

#### *Alberta*

As part of this Division's boundary maintenance program, a total of 42 miles of existing boundaries were reopened on John D'Or Prairie I.R. No. 150 and Driftpile River I.R. No. 150.

#### *Saskatchewan*

Survey of 17 miles of road right-of-way within the boundaries of Chicken I.R. No. 224, Black Lake, Saskatchewan was carried out.

#### **Plans for 1971**

##### *Yukon Territory*

The survey of a subdivision at Dawson is to be done. Survey of relocated portions of roads at Whitehorse and Carcross is planned, as well as a total 32 parcel surveys at various settlements and recreation areas and along the highway system throughout the Yukon.

##### *Northwest Territories*

Subdivisions at Lake Harbour, Coral Harbour, Frobisher Bay, Clyde River, Cambridge Bay and Arctic Red River are to be undertaken. Surveys of 32 parcels of land at various settlements, at recreation areas along the highway system and throughout the Mackenzie River basin are planned.

#### *Alberta*

Boundary surveys on Wabasca I.R. No. 166C and Sturgeon Lake I.R. No. 154 are planned; also retracement surveys on Utikoomak Lake I.R. Nos. 155, 155A and 155B. Additional work to re-establish certain monuments on Driftpile River I.R. No. 150 is also proposed for this season.

#### *Saskatchewan*

Survey of village lots and the natural boundaries as well as the resurvey of the rectilinear boundaries of Southend I.R. No. 200; Saskatchewan is to be undertaken.

#### *Topographical Survey*

##### **Responsibilities**

To produce and maintain the National Topographic Series of maps at the 1/25,000, 1/50,000 and 1/250,000 scales; to administer through the Interdepartmental Committee on Air Surveys the acquisition of aerial photography for mapping and development purposes.

##### **Long-term Plans**

The long-term plans of the division are to complete mapping coverage of Canada at the 1/50,000 scale, observing priorities of map users, and to maintain up-to-date mapping done at the 1/25,000 and 1/250,000 scales.

#### **Review of 1970 Operations**

Mapping at the 1/50,000 scale was done for 258 sheets representing 80,000 square miles in northern Labrador and Quebec, in the Churchill River basin in Manitoba-Saskatchewan, on the Athabasca River and Mackenzie Highway in Alberta, in the Nahanni River basin, N.W.T. and in the Van Gorda and Crest mining areas in the Yukon.

Photomapping at a scale of 1/31,680 was done for 128 sheets in the Henik Lake, Baker Lake and Thelon River areas of the N.W.T. and in Borden Peninsula on Baffin Island.

Seven 1/250,000 maps were revised.

Special plots at larger scales were made at Coppermine and Yellowknife N.W.T. and of Indian Reserves at Brochet and Nelson House, Manitoba. A number of plots of northern sites were updated.

Aerial photography was obtained for about 90,000 square miles — 45,000 sq. miles in northern Alberta and British Columbia, 25,000 sq. miles around Great Slave Lake and lesser amounts at Fort Norman and east of Inuvik.

##### **Plans for 1971**

Mapping at the 1/50,000 scale is planned for another 250 sheets around Rankin Inlet, in northern Saskatchewan and Alberta and along the proposed pipeline route through the Yukon and the Mackenzie River valley.

Photomapping is planned for 145 sheets, extending the areas done in 1970 for Indian Affairs and Northern Development. A number of plots of northern settlements will be updated for the same department. Another large program of aerial photography is planned for 1971 in support of the mapping in the Mackenzie River valley.

#### *Map Production Division*

##### **Responsibilities**

To publish the National Topographic series of maps produced by the Topographical Survey and to produce and maintain smaller-scale series of maps such as aeronautical charts and parks, electoral, atlas and general-purpose maps.

Five special aeronautical charts at a scale of 1/250,000 were produced in 1970 to assist radar approach to weather research stations at Alert, Cornwallis Island, Eureka, Isachsen and Mould Bay.

The continuing program comprises periodic revision of aeronautical charts and other small-scale maps, publication of the National Topographic series of maps and provision of specialized reproduction services to other branches and departments.

#### **TASK FORCE ON NORTHERN OIL DEVELOPMENT**

The Task Force on Northern Oil Development was established in December, 1968, under chairmanship of the Deputy Minister of Energy, Mines and Resources, to consider all

aspects of northern oil development, transportation and marketing. The Task Force membership includes the Deputy Minister of the departments of Indian Affairs and Northern Development, Transport, and Environment, and the Chairman of the National Energy Board. The long-term plans of the Task Force call for the organization and appraisal of studies needed to encourage optimum development of northern oil resources and also to ensure adequate government supervision and control over activities related to this resource program. With industry plans under way for oil and gas pipelines from the far north, the Task Force carries on a continuing review and appraisal of industrial activity to ensure that industrial programs will be in the national interest. Task Force plans are designed towards the ultimate objective of the most economic recovery of northern oil in keeping with adequate protection of the Arctic environment and maximum employment opportunities for northern citizens.

During 1970, the Task Force made several reports to government, one of which led to the establishment of northern pipeline guidelines. These guidelines provide terms of reference for industry in its northern oil activities and relate to the common carrier concept of northern pipelines, environmental control, employment for northern residents, and full opportunity for investment by Canadians in northern pipelines. The Task Force also continued its on-going appraisal program of exploration, transportation and market development related to northern oil activity for the purpose of advising the government on matters of national interest.

Task Force plans for 1971 include further development of the northern pipeline guidelines, special emphasis on co-ordination of research concerned with environmental control, and engineering and economic studies of proposed oil and gas pipelines from Alaska and the Arctic to markets in eastern Canada and the United States.

## **UPPER YUKON RIVER POWER DEVELOPMENT**

Joint Canada-United States studies were carried out during 1969-70 to determine the market potential for power which could be obtained by diverting the headwaters of the Yukon River. The Province of British Columbia and the State of Alaska were also involved in these investigations. Over 4000 MW could be installed and it was found that conditions might develop in which it would be attractive to undertake such an installation in this region, but no additional work is planned in the immediate future.

## DEPARTMENT OF EXTERNAL AFFAIRS

### Responsibilities

The Department of External Affairs is concerned with any activities in the north conducted on behalf of or in co-operation with foreign governments or their agencies, including scientific or other projects in both the civil and military spheres. The Department is responsible for consulting the appropriate departments with respect to official applications for foreign scientists and explorers to carry out research in the Arctic as well as clearances to foreign vessels intending to engage in scientific research or exploration in Arctic waters. Through membership on the Advisory Committee on Northern Development, the Sub-Committee on Arctic Research and other sub-committees, the Department provides advice on matters with foreign policy implications and also has responsibility in connection with the negotiation of agreements with other countries arising out of Arctic activities. Similarly, the Department has an advisory, coordinating and operational role in matters of international law and policy with respect to the status and uses of the waters adjacent to the Canadian Arctic islands including, in particular, navigation and pollution control as well as the exploration and exploitation of the offshore resources under these waters.

## DEPARTMENT OF FISHERIES AND FORESTRY

### RESOURCE DEVELOPMENT BRANCH

#### Responsibilities

- To conduct programs directed at the more efficient management of the sport and commercial fisheries.
- To play a co-ordinating role in federal-provincial programs.

#### Long-term plans

- Intensive study and management of Great Slave and Great Bear lakes.
- Establishment of a comprehensive program to manage other lakes for sport and commercial fishing.
- Inventory and management of the stream sport fisheries primarily based upon the Arctic grayling.
- Efficient management of the anadromous Arctic char fisheries of the northern coast.

#### Review of 1970 Operations

- The rainbow trout introduction program was continued in the Yukon. Several thousand rainbow trout fry were released into Wye Lake and into Chadburn Lake. Rainbow trout fry planted in Wye Lake in 1969 provided sport fishing during the summer of 1970 which supports the thesis that plantings of high-quality fry are successful in Yukon Territory waters.
- Observations of mines, the Mackenzie River delta and valley, Great Bear Lake and Great Slave Lake were made in the fall of 1970 with the view to starting biological studies in these areas in 1971.

#### Plans for 1971

Studies of lakes started in 1970 will be continued, with a view to conducting population assessments, growth rates and

pressure created by commercial fishing. Other work will be carried out to determine a suitable site for a study on a typical population of Arctic char, so that the effects of controlled harvesting can be measured.

### INSPECTION BRANCH

#### Responsibilities

- Monitoring and standardizing plant compliance to ensure regulatory requirements are met.
- Technical assistance in handling, processing, transportation, storage and distribution of fish.
- Laboratory analyses of domestic products and plant sanitary surveys as well as water and ice analyses to ensure bacteriological standards are met.
- Inspection of freshwater species to ensure market acceptance of domestic and imported fish and fish products.

#### Long-term Plans

Priorities are for the continued inspection of domestic and imported fish and fish products to ensure compliance with standards pertaining to hazardous substances, organoleptic, bacteriological and labelling requirements, and to assist industry in improving processing techniques and product development.

#### Review of 1970 Operations

- Annual registration of fish processing establishments in N.W.T. (two registered packing plants, one registered cannery, one registered fresh and frozen plant and numerous non-registered packing plants.)
- Collection of gut samples from 19 lakes in N.W.T. for *C. botulinum* survey. (Samples sent to Fisheries Research Board, Vancouver.)

- Collection of samples from commercial production in N.W.T. for mercury analysis. (Samples sent to inspection lab., Winnipeg.)
- Collection of end-of-line samples, water and ice samples, in-plant sanitary surveys, quality determinations, *T. crassus* determinations. Training courses at various locations for primary commercial fishermen and industry management personnel.

#### Plans for 1971

- in accordance with long-term plans.

### CONSERVATION AND PROTECTION BRANCH

#### Responsibilities

- To conserve and protect fishery resources and the environment as a whole.
- To manage the commercial, sport and Indian food fisheries.
- To carry out a liaison and educational program with industry, the general public and other government departments regarding the responsibilities and aims of the Department of Fisheries and Forestry.

#### Long-term Plans

To maintain and develop fish and mammal stocks throughout the North, through the proper utilization of our resources and equipment.

#### Review of 1970 Operations

- Enforcement of commercial fishery regulations on Great Slave and other lakes within the area of responsibility.
- Surveillance over recreational fishery and enforcement of quotas where applicable.
- Research projects on Arctic char and other sport fish on behalf of Resource Development Branch and Fisheries Research Board.
- Gathering and compilation of statistics for the commercial, sport and domestic fisheries.
- Lake survey projects to ascertain fishery best suited to that particular body of water.
- Effort was made to spot-check industrial, logging and mining activities and to cause action to be taken in cleaning up sites left in a deplorable state by mining and oil exploration companies.

#### Plans for 1971

A continuation and, hopefully, an expansion of field programs and activities. In addition, surveillance and remedial action to preserve the environment.

### FISHERIES RESEARCH BOARD OF CANADA

*ARCTIC BIOLOGICAL STATION, (Ste. Anne de Bellevue, Que.)*

#### Responsibilities

Biological investigation of the marine environment in Canada's North, with special emphasis on the distribution, abundance and ecology of marine mammals and fishes.

#### Long-term Plans

Biological assessment of fisheries resources will be continued in order to provide a sound basis for maximum sustained yield of mammals and fishes, with current emphasis on the ringed seal. Marine productivity studies, now mainly carried on at Frobisher Bay, will be expanded to the western Arctic. These will provide baseline values for future assessment of possible undesirable changes in the aquatic environment.

#### Review of 1970 Operations

##### Marine Mammals

A five-year study of the population dynamics of ringed seals in Cumberland Sound and the Home Bay area of eastern Baffin Island was completed and presented as a doctoral dissertation. The population parameters derived from this study will be used to assess the maximum sustainable yield of ringed seals in other areas of the Arctic.

Another doctoral dissertation was completed on a study of white whales in southeastern Baffin Island.

##### Biological Oceanography

During 1970, the third year of a continuing marine ecology study of upper Frobisher Bay was completed at Station 5, 63° 40'N, 68° 27'W, and other nearby locations.

Work was continued on the impressively diversified benthic fauna, on the seasonal variation in certain zooplanktons, and on the identifying and counting of phytoplankton. A start was made on the assessment of population levels and trophic relationships of the major fish species. Measurements were made throughout the winter on phosphates, nitrates and chlorophylls at various depths in the sea ice, and observations were made on the sea-ice flora. During late winter, there was clear evidence of a developing flora which grows under extremely low light intensities. Concentrated in late winter near the undersurface of the ice, the flora is evidently released to the plankton soon after ice melting begins in June. Studies were begun on the Arctic cod (*Boreogadus saida*) in Frobisher Bay, with particular attention being given to the feeding of the larvae.

### Marine and Anadromous Fish

Landlocked Arctic char were tagged in Sylvia Grinnell Lake and a brief survey of Amadjuak and Nettiiling lakes was carried out under contract. Amadjuak Lake contains sea-run Arctic char which could provide a bountiful sports fishery in years of good weather.

Tagged-char returns from Kuujua River of western Victoria Island indicate heavy domestic exploitation of the fishery resource. Further studies at Pelly Bay also agreed with previous indications of heavy exploitation of char stocks by the domestic fishery.

Preliminary work on marine fish studies was started in Frobisher Bay during August. Samples were collected throughout the length of the Bay where convenient bottom type was suitable for trawling. Age, size, mortality and stomach contents of the more abundant species of fish were examined.

### Plans for 1971

Field work on Arctic marine mammals will be confined to a population study of the ringed seal at Holman Island in the western Arctic and to an ecological study of the white whale in Hudson Bay in relation to mercury contamination.

A new study designed to provide baseline values of the relatively undisturbed marine ecosystem still present in the western Arctic will be started. A field facility will be set up and it is planned that the first data will be in hand before the end of the summer. The ecology study at Frobisher Bay will be continued, with major emphasis on fishes, bottom invertebrates and the biological and chemical regime of the sea ice.

A detailed study of the abundance and ecology of marine fish and invertebrates will be initiated in the western Arctic.

### FRESHWATER INSTITUTE, (Winnipeg, Man.)

#### Responsibilities

The investigation of the fresh waters of the Northwest Territories, with specific emphasis on fisheries and the aquatic environment.

#### Long-term Plans

The assessment of the fisheries resource, both with respect to present stocks and the productive capacity of the waters of the Mackenzie drainage basin; investigation of the present status of these waters with respect to nutrients, primary and secondary production and the quality of the environment. Of most immediate concern is the examination of Great Slave Lake and surrounding lakes, with the aim of establishing adequate managerial procedures.

#### Review of 1970 Operations

Work in the Northwest Territories was again severely restricted by shortage of staff and funds; however, considerable effort was directed toward continuing the examination of the fishery on Great Slave Lake and the development of a revised scheme of management. Consultations were held with

personnel of the Territorial Government and the Department of Indian Affairs and Northern Development, and the Freshwater Institute was represented at meetings of the Northwest Territories Fishery Advisory Council.

During the commercial fishing operations on Lac la Martre a field crew made an analysis of the catch and a limnological survey of the most heavily fished area.

A new computerized system of handling catch data from N.W.T. and other waters was developed in co-operation with the Canadian Fisheries Service, as an aid to effective management.

### Plans for 1971

Work will be continued on the Great Slave Lake and Lac la Martre fisheries. Available data on all lakes in the Territories will be reviewed for both sports and commercial fisheries with a view to designing a more comprehensive program to meet the long-term needs when sufficient staff are available.

## CANADIAN FORESTRY SERVICE

### Responsibilities

- To conduct forest insect and disease surveys; to prepare forest inventories and maps.
- To provide advice to the Department of Indian Affairs and Northern Development on forestry operations and practices.
- To conduct ecological research in forested areas.
- To compile national statistics on forest stocking, growth and depletion and annual fire losses.

### Long-term Plans

Owing to the new responsibilities of the Department of the Environment and pressures generated by increasing industrial activity, the long-term plans for the Canadian Forestry Service call for greatly increased activity in inventory and mapping and ecological studies of the impact of land use on the quality of the environment.

#### Review of 1970 Operations

Operations were restricted to activities in forest insect and disease survey and to compilation of national forestry statistics.

### Plans for 1971

Activities for this year will greatly increase. A team of five professionals (three from Northern Research Centre in Edmonton and two from the Forestry Management Research Institute) will be collaborating with the Geological Survey in a study of terrain sensitivity in the Mackenzie valley pipeline corridor. Routine insect and disease surveys will continue as usual.

## DEPARTMENT OF INDIAN AFFAIRS & NORTHERN DEVELOPMENT

### CANADIAN WILDLIFE SERVICE

#### Responsibilities

Surveys and inventories of wildlife resources; conducting of research on wildlife species in relation to their habitat; collection and analysis of animal population and utilization data; recommendation of management procedures for particular species of economic importance; research, management, and administration of migratory birds under the Migratory Birds Convention Act; coordination of federal, provincial, and territorial action on common wildlife problems, including caribou research and management; studies on wildlife disease and pollution.

#### Long-term Plans

To continue studies of major wildlife resources; to extend research to less-known species; to establish more adequate research facilities in the field; to assess the success achieved in management of wildlife resources to date and the potential success in this endeavour for the future.

### Review of 1970 Operations

#### Mammalogy Projects

The intensive study of the Manitoba-Keewatin caribou herds with special emphasis on determining the factors responsible for high calf mortality was concluded as a scientific team effort. Some terminating reports on data gathered were submitted. Radio-tracking techniques were successfully used to track some caribou from their wintering to calving grounds.

The research project on Dall sheep in the Mackenzie Mountains was continued with more intensive field studies on the biology of the sheep. An inventory of other mammals in Zone 12 and Zone 19 was continued, with added emphasis on woodland caribou utilization by Indians.

Work on bison in the Northwest Territories and in Wood Buffalo National Park was continued, with emphasis on putting management disease-control measures into effect.

Research continued on the nutritional requirements and the physiological characteristics of barren-ground caribou and reindeer.

A study of wolf ecology on Baffin Island was concluded in 1970 and a report in the form of a doctoral dissertation was submitted.

Polar bear research continued, with emphasis on tagging and radio-tracking to obtain information on movements and life history. A scat-analysis program was carried out to determine food habits. Additional manpower was recruited to facilitate the collection of data from the Arctic Islands archipelago.

Long-term field studies on grizzly bears in the Yukon Territory were terminated and a report submitted.

Field studies of the population ecology of muskrats, beaver, and mink on the experimental trapping area in the Mackenzie delta are nearing conclusion and the data gathered are being analysed.

Studies on the high mortality found in young arctic fox were continued in the Baker Lake area in co-operation with the University of Saskatchewan.

#### Environmental Studies Projects

An Environment Studies Unit was established. Data on the effects of oil exploration and mining activities were collected and preliminary results published in a report. Also, preliminary arctic wildlife ecology maps were produced outlining the critical areas for wildlife in the Northwest Territories and Yukon Territory.

#### Ornithology Projects

A six year study of the breeding biology and distribution of Ross' geese in the Queen Maud Gulf area has been completed. The material gathered is presently being processed and the results are being published.

A biological assessment of geese breeding on the Great Plains of the Koukdjuak was completed and a report is being prepared for publication.

Three contracts with the University of Western Ontario were continued as part of an integrated study of the

population dynamics of small races of Canada geese and snow geese at McConnell River and several progress reports were received.

A study of the population genetics of snow geese was continued at La Pérouse Bay, Manitoba and a significant number of geese were banded.

A study of the imprinting of day-old snow geese goslings was completed.

Periodic surveys of whooping crane breeding areas in Wood Buffalo National Park were continued. A record total of 14 nests was found. No eggs were removed.

Investigations of ravens and whistling swans in the Mackenzie delta continued.

An exploration of greater snow geese nesting areas was undertaken in conjunction with the Government of Quebec.

A survey was made of pesticide residue levels in peregrine falcons, gyrfalcons and the principal prey species in the Thelon, Coppermine and Bathurst Inlet areas.

A survey of the economic impact and utilization of wildlife in the Mackenzie delta was continued.

## **Plans for 1971**

### **Mammalogy Projects**

The statistical and laboratory analysis of data collected from the studies of the Manitoba-Keewatin caribou herds will continue. A study of Southampton Island caribou range and Coats Island caribou herd will be undertaken. Range studies in the Keewatin caribou will continue in the area of the Manitoba-Keewatin.

Polar bear research will continue with emphasis on tagging bears, collecting specimens and population data and conducting studies of denning areas. Morphometric work on USSR polar bear behaviour, food and nutritional studies will be supported.

Muskox studies will be undertaken at Bathurst Island.

Contract services to provide laboratory services and literature reviews of the arctic wolf, barren-ground grizzly bear and Peary caribou will be established.

An histological analysis of reindeer ovaries will be undertaken.

Data accumulated on the population ecology of muskrats, beaver and mink on the experimental trapping area in the Mackenzie delta are being analyzed and specimens examined.

Grizzly bear ecology studies have been completed and the preparation of reports will be continued.

A liaison officer to the Northwest Territories Government will be installed.

Arctic fox behavioural studies in conjunction with the University of Saskatchewan will be concluded.

Work on liaison in the Northwest Territories and in Wood Buffalo National Park will be maintained with continued emphasis being put on effective management disease-control measures.

### **Environmental Studies Projects**

The second phase is beginning and will include more long-term and definitive studies on the effects of oil exploration and mining activities on wildlife and its habitat.

## **Ornithology Projects**

The snow geese population genetics study will be terminated.

There will be continued banding of snow geese at Cape Henrietta Marie and McConnell River.

There will be no change in the projects not listed as being terminated in 1970.

## **COMMUNITY AFFAIRS BRANCH**

### **Responsibilities**

To administer the Indian Act in such measure as it applies to the Yukon where there are no reserves set aside for the Indian people as defined by the Indian Act. To support implementation of the policies to ensure that Indians are provided the services and facilities enabling them to participate equitably in the Canadian way of life, while retaining or preserving their identity as distinct ethnic groups.

### **Long-term Plans**

To transfer responsibilities for specified services to the Indian people in a manner designed to eventually result in complete management and control of their own affairs.

### **Review of 1970 Operations**

The major result of this year's activities has been the establishment of successful relationships between the Indians, Yukon Native Brotherhood, and the Agency, through consultation regarding matters and policies concerning the transfer of certain responsibilities to Indian control, effective in 1971.

### **Plans for 1971**

To assist the Yukon Native Brotherhood in maintaining satisfactory management policies of functions transferred and objectively continue the effective transfer of further responsibilities as competency and organizational capabilities are systematically developed within the Brotherhood and the Indian Bands.

### **Cultural Development**

#### **Responsibilities**

To provide guidance, encouragement and liaison for cultural development activities for Indian groups and individuals.

#### **Long-term Plans**

With the transfer of most government services to the northern region, responsibility for Indian Cultural Development remained at headquarters. The main function of cultural development has been the distribution of cultural cash grants where a need is demonstrated by a group or an individual status Indian. In 1969, cultural grant funds were for the first time extended to Indians of the Territories. This shall be a

continuing responsibility. In addition, the services and expertise of the Cultural Development Division in Ottawa are available in the field of literature, fine arts and language retention. There are concrete indications that all the services available will be in demand.

### Review of 1970 Operations

The Yukon Native Brotherhood requested and received \$5,000 to stage Indian Days, the first ever held in the Yukon. It was a success both in the cross-cultural sense, as many of non-Indian population were unaware of their neighbours' cultural achievements, and from a financial point of view. They have funds remaining for a 1971 event and will extend their activities to two more centres.

In the Northwest Territories Centennial Year, the Indians were well represented as a result of three cultural grants. A grant of \$5,000 enabled them to stage an exhibition of handicrafts, art, dancing and music on a large scale in time for the royal visit. The National Indian Princess Pageant, held annually in a different city each year, was held in Yellowknife because of a cultural grant of \$4,400 that was extended to the Indian people to host the event. An additional \$2,500 grant was made to assist them in selecting their own princess before the national finals.

### Plans for 1971

To continue to provide guidance, encouragement and liaison for cultural development activities for Indian groups and individuals.

## INDIAN CONSULTATION AND NEGOTIATION GROUP

### Responsibilities

The Indian Consultation and Negotiation Group (I.C.N. Group) has the responsibility of providing financial assistance to Indian organizations which are officially recognized as representatives of Indian Bands. This responsibility includes the provision of financial support to the national, provincial and regional Indian organizations and Bands for consultation meetings on Departmental policies, programs and related issues. The I.C.N. Group also provides a consultation capability on behalf of the Department.

### Long-term Plans

The I.C.N. Group will continue to provide financial support to native organizations in conjunction with assistance available from other governmental departments and agencies.

It is also planned to identify, research and document the various specific problems experienced by native associations in the North and to identify alternative methods by which these problems may be resolved.

### Review of 1970 Operations

Grants to the territorial Indian associations for operational and organizational provisions were originally based on a nationwide per capita grant base of \$1.00 for each Indian person an association represented. It became apparent that this amount was not sufficient to cover annual operating costs in the Territories due to geographic dispersal and relatively small population figures. Treasury Board approval was therefore obtained to provide supplementary funds to raise the total maximum annual grant of \$15,000 for each association. The authority was retroactive and effective for the previous fiscal year 1969/70. A summary of the funds allotted for operational purposes and for meetings follows:

	<i>Indian Brotherhood of the N.W.T. (\$)</i>	<i>Yukon Native Brotherhood (\$)</i>
Organizational & Operating grants (includes \$15,000 – 1970 and supplementary for 1969)	23,918	27,438
Meetings between Department and associations	8,000	8,000
all chiefs	10,450	12,400
associations and Bands	13,500	16,800

### Plans for 1971

Administrative expertise and consultation services will be provided by the I.C.N. staff upon request. The consultation function will continue as will the funding of associations.

It is planned to develop a system for identification, research and documentation of specific problems faced by the Indians in the Northwest Territories and the Yukon and in consultation with them to search for solutions that may be acceptable to the Indian people and to the government.

## INDIAN-ESKIMO ECONOMIC DEVELOPMENT BRANCH

### *Yukon Indian Agency*

### Responsibilities

To plan, organize and initiate, in cooperation with the Indian people, other government agencies, private firms, organizations and individuals, a comprehensive development program to include logging, sawmilling, big-game guiding, fish guiding, handicrafts, mining, trapping, tourism and fishing; and to stimulate a steady growth of self-reliance and economic independence.

### Long-term Plans

To systematically develop small businesses and co-operative enterprises for the Indians; to provide the supervision, managerial and training support required to establish a firm foundation for eventual economic independence in managing their own affairs; to narrow the credibility gap that exists between financial institutions and the prospective Indian businessman by establishing equity through the provision of grant assistance.

### Review of 1970 Operations

#### Fishing

The salmon harvest yielded 110,000 lbs. of which 85,000 lbs. was used for home consumption, for a value of \$70,000. A salmon egg harvesting operation was initiated in Dawson City to supply eggs for processing and packaging as sport fishing bait.

#### Big-Game Outfitting

Frank Sidney of the Teslin Band operates the only Indian big-game outfitting operation in the Yukon. Guiding enterprises employ 60% Indian employees, with a cash income estimated at \$50,000.

#### Fish Guiding

Three new fish guiding enterprises were organized in 1970. Indian-operated fish guiding operations in the Yukon now total six.

#### Handicraft

Handicraft gross sales in 1970 amounted to \$96,000, up 20% from last year.

#### Logging and Sawmilling

Serious forest fires and a depressed economy have jeopardized the future of the Ross River Co-operative. Operations have been temporarily curtailed pending the return of more favourable markets for lumber products.

#### Mining

Educational program in prospecting for minerals were conducted. Several Prospector's Assistance Grants were made in 1970.

#### Trapping

Annual income to trappers has dropped from \$80,000 to \$74,000, due mainly to the depressed fur market. Trapper education programs have been discontinued.

#### Co-operatives

A co-operative enterprise at Old Crow was organized. A new store was constructed incorporating facilities for merchandising, warehousing, weather recording apparatus, C.N.T. communication equipment, four-bedroom manager's quarters and post office.

### Education

Indian students in the Yukon attend Yukon public or parochial schools as the Department does not operate any federal schools in the Territory. In 1970-71, a total of 1,031 Indian students were enrolled in Yukon education programs. Two students residences at Whitehorse continue to be operated by the Department, accomodating a total of 180 students. In the British Columbia portion of the Yukon agency, the Department is responsible for the operation of a student residence at Lower Post and the federal school at Iskut Lake (Klappan). Vocational education is carried out under the joint auspices of the Territorial Government and Canada Manpower. A number of post-secondary students attended vocational schools in Edmonton, Vancouver and Victoria, as well as in Fairbanks, Alaska, in order to take courses which are not available in the Territory.

### Plans for 1971

#### Fishing

We plan to continue encouraging more harvesting of salmon eggs, in conjunction with salmon, for commercial sale. It is not expected that the industry can be developed to the extent of Alaska's 6-1/2 million dollar-a-year industry; however, an attractive potential does exist. Assistance in the provision of nets and other equipment to fishermen will continue, particularly to the families utilizing fish for domestic purposes.

#### Big-Game Outfitting

A second big-game outfitting enterprise will commence operation in 1971, providing employment and income for approximately twelve Indians.

#### Handicraft

A feasibility study, and probable initiation, will be conducted in a fur-garment and handicraft manufacturing co-operative enterprise. This is to be operated in conjunction with a fur-lofting service, by which local furs will be selected for use, and surplus forwarded to auction centres. A higher income to trappers should result, along with increased employment and production to workers engaged in handicraft manufacture. The local retail outlet estimates gross sales of \$110,000 for 1971.

#### Co-operatives

Managerial assistance will continue to be provided to the Old Crow Co-operative in operating its general store business, M.O.T. weather transmission data, and C.N.T. communications centre. A constant-training program will be implemented to educate and instruct candidates for eventual self-management of the enterprise.

## NATIONAL AND HISTORIC PARKS BRANCH NATIONAL PARKS SERVICE

### *Wood Buffalo National Park*

#### Responsibilities

The Branch operates Wood Buffalo National Park in Northern Alberta and the Northwest Territories. This entails provision of services for visitors, protection of natural resources and supervision of permitted resource uses.

#### Long-term Plans

The Parks Planning Division of the Branch will undertake field studies during the spring and summer of 1971 to assess the park's resources and values and to determine the best use of the park lands. Upon the completion of field studies a provisional master plan for the development of the park's resources will be prepared with a view to an increased use of the park by visitors. The scope of the buffalo management program will be increased in future years. The enlarged program had been planned to begin in 1969-70, but financial limitations dictated a rescheduling of the work. Temporary repairs will be made to the corrals in 1971 and the abattoir will be renovated when funds become available. In order to remain within budget limits, the work is scheduled for completion by 1973.

#### Review of 1970 Operations

The capital budget for 1970-71 was \$31,214. No major construction was carried out; funds expended were devoted to replacement of obsolete equipment and minor facilities.

The operations and maintenance expenditure for the year was \$456,964. The expenditures were allocated as follows (amounts include applicable salary and wages costs):

Roads maintenance	\$ 57,931
Building and equipment maintenance	47,725
Resource conservation	286,418
Administration and general	68,821
Visitor service	4,472

In addition, an unbudgeted amount of \$1,533,294 was spent in fire suppression. The Park had 58 known forest fires burning a total of approximately 193,085 acres. In comparison, all other national parks reported a total of 69 fires burning approximately 65 acres.

The buffalo management program, under resource conservation involved a summer roundup for anthrax vaccination. Just under 4,000 animals were treated. Regular aerial surveys were carried out during the summer; no evidence of disease outbreak was seen. The herd was reduced by 200 animals and the meat provided to local native people.

Outside of forest protection and buffalo management, operations of the park were directed to: upgrading the physical establishment; staff development; increasing knowledge of the park; and supervision of resource extraction activities — hunting, trapping and timber berths.

#### Plans for 1971 (General)

A spring field survey of Wood Buffalo National Park is to be initiated by the Planning Division of the Branch in late March and early April for the purposes of assessing the park's resources and values. This survey will consist of aerial reconnaissance and will provide the basis for the preparation of a provisional master plan for the park. Field studies will be continued during the summer by resource and wildlife specialists and master planners. A draft of the provisional master plan will be produced by the end of the calendar year.

In addition, the Branch is participating in an interdepartmental study conducted by the Peace-Athabasca Delta Task Force to determine the immediate and long-range effects of the Bennett Dam on the delta environment.

#### *Future National Park, Great Slave Lake, N.W.T.*

Following the January, 1969, presentation of the proposed national park to the Territorial Council and the June public meetings which were subsequently held in Yellowknife and Snowdrift, boundaries for this park proposal were revised and a submission was prepared for Privy Council consideration. This submission was approved by Privy Council in late March, 1970, and publicly advertised immediately thereafter.

The press release issued April 10, 1970 headlined this action in the following manner:

"A 2,860-square-mile area around Fort Reliance on the east arm of Great Slave Lake in the Northwest Territories has been set aside by order-in-council as a basis for planning a future national park, Northern Development Minister Jean Chrétien announced today."

Ecological surveys of the reserved lands were undertaken during the summer of 1970 by the Canadian Wildlife Service at the request of the National and Historic Parks Branch. The data resulting from these studies are currently being finalized in a report which will be available shortly. The information contained therein should provide a valuable basis for future land-use planning.

Discussions with the Snowdrift Band continued throughout the year to ensure that, before any final decision on the proposed park is made, the views of the Band are considered and fully explored. The chief and some Band elders travelled to Banff and Prince Albert both in winter and summer to observe established national parks from development, use and preservation points of view. The results of these trips, as they relate to the proposed park on Great Slave Lake, are still being considered by the Band. Future meetings with the Band and the Indian Brotherhood are being planned for the coming year.

No additional field studies are planned at this time for the area. However, discussions with the Indian Band will continue as required.

*Proposed National Park, South Nahanni River, N.W.T.*

Studies were continued on this national park proposal during the summer months. At the request of the National and Historic Parks Branch, the Canadian Wildlife Service carried out detailed ecological surveys of the region to document the biotic phenomena and to assess proposed boundaries from a biotic point of view. The results of these studies are currently being formalized in a report and will be available shortly.

Speleology studies were carried out under contract by Jean Poirel, expedition leader of "Nahanni '70". Caves in the Lafferty Creek area of the First Canyon were examined for their archaeological, geomorphological and public use significance. Reports were submitted in December, 1970 and are currently being assessed by the Branch. Preliminary indications are that some of the caves found here will have considerable appeal to park visitors whereas others may appeal only to the more avid speleologist.

Finally, park planning studies related to boundary assessments were carried out here as well as examinations of nearby areas such as Hotsprings Valley. Rabbitkettle Hotsprings, an imposing, dome-like, calcareous tufa structure rising 90 feet or more above the valley floor was identified as an outstanding natural feature worthy of protection at the national level. Whether it will be considered a separate entity or whether it will be suggested as a satellite to the proposed national park has not yet been determined. It currently is being protected from surface alienation by a departmental land reservation.

A submission to Privy Council was forwarded in March, 1971 seeking a withdrawal of lands for a future national park under the Territorial Lands Act. It is expected a ruling on this submission will be made early in the coming fiscal year. Approval of this submission would see an 870-square-mile area withdrawn from further alienation of any sort for future national parks purposes, thereby setting aside for public use and enjoyment the most outstanding portions of one of this continent's wildest and most spectacular rivers.

Approval to withdraw the necessary lands for a future national park was received on April 6, 1971 as contained in Privy Council Minute (PC 1971 - 649)

*Proposed "Pingo National Park, Tuktoyaktuk Peninsula, Northwest Territories*

Field examinations of the Tuktoyaktuk Peninsula, Mackenzie delta and environs were undertaken by the Canadian Wildlife Service, International Biological Program (IBP) representatives, and national parks planners, to assess the significance, desirability and feasibility of including pingo terrain within a possible national park. These studies were undertaken separately, but the conclusions reached in all three was that the Tokon Point area (immediately northeast of Tuktoyaktuk) represents the principal remaining opportunity to set aside a meaningful sample of pingo landscapes. Preliminary recommendations, subsequently made to senior officials of the Department, suggested a 100-130 square mile area be considered as a future "Pingo National Park"

In view of the fact that the lands involved were already under lease to Imperial Oil Limited, informal arrangements with the company were completed in October, 1970 to minimize damage and in some instances to postpone or minimize seismic activities within the area of interest. Further arrangements were subsequently finalized in March, 1971 for a national parks representative to join the seismic crews on-site to witness first-hand the type and extent of activities being undertaken. It is expected this co-operative effort will establish important contacts and relationships which should help to reduce areas of potential conflict through better understanding of the needs and objectives of both parties.

Pingos, which are large dome-like structures of ice covered by a thin mantle of soil and vegetation, are but one of several aspects of frost phenomena which characterize northern environments. They are found rather sparingly in the Russian North and in Alaska, but by far the best development of this phenomenon occurs in and around the Tuktoyaktuk Peninsula, with more than 1,700 pingos recorded. The fragile nature of pingos; the international significance attached to a scarce world phenomenon; and recently accelerated seismic activities in this region strongly recommend an immediate consideration of national park values here if such are indeed to be included in the national parks system of Canada. It is anticipated a national park proposal will be formalized in the coming fiscal year.

A proposal will be formulated during the fiscal year which will identify the area of interest to the national parks program. Liaison with Imperial Oil Limited will also continue with a view to minimizing or removing obstacles to a mutually satisfactory arrangement.

*National Historic Sites Service***Responsibilities**

During the past several years, the National Historic Sites Service has carried out a thorough review of persons, places and events in Yukon territorial history. A number of items have been identified as being of national historic importance. They will be commemorated by the federal government with assistance from the Yukon territorial government where advisable.

**Long-term Plans**

To assist territorial governments in their historical marking program. To implement, after acceptance by the Minister of the Department of Indian Affairs and Northern Development, and according to priorities, all recommendations by the Historic Sites and Monuments Board of Canada.

An historic sites program was announced in 1969 for the Yukon Territory with three main interpretive themes.

The first is to interpret the Chilkoot and White Pass Trails travelled by the gold seekers from Dyea and Skagway to

**Bennett, British Columbia.** This is to be undertaken with the United States through the development of a park to be known as the Klondike Gold Rush International Historic Park.

The second theme will be the wintering at Bennett, stabilization of the old Presbyterian church there and the development of an interpretive centre. The last theme involves water transportation to the gold fields and the coming of the railroads. Plans include restoration of the S.S. *Klondike* over a five-year period at an estimated cost of \$238,000.

Included in the over-all restoration picture will be the acquisition and restoration of some 14 buildings at Dawson City and the acquisition of a gold dredge and property at Bonanza Creek, scene of the first strike. Total development costs are estimated at \$2,000,000 and the work is scheduled over an eight-year period.

#### Review of 1970 Operations

Commemorative plaques were unveiled in the Northwest Territories marking national historic sites at Fort Smith, Fort Simpson and Fort Providence. The Yukon program is well advanced, some 10 buildings having been acquired in Dawson City including the post office building and the Robert Service cabin. The Department agreed to accept the extensive collection of Gold Rush artifacts amassed by the Dawson Museum and Historical Society. The Gold Room (and contents) at Bear Creek has been obtained and Dredge No. 4, sited near Discovery Claim, was presented to the Department. Agreement has been reached with the Commissioner of the Yukon Territory with regard to the St. Mary's Hospital (sometimes called the Court House) towards its use by the Department. A request has gone to the Province of British Columbia to obtain the old Presbyterian church and adjoining property at Bennett. Joint planning on the Klondike Gold Rush International Historic Park continued with the U.S. National Park Service.

#### Plans for 1971

Restoration will continue on the sternwheeler S.S. *Klondike* and additional property acquisition will be undertaken for the Yukon historic sites program. Buildings acquired at Dawson City will be protected against deterioration. Minor alterations are planned for St. Mary's Hospital towards its use as a personnel and general administration centre for the Dawson area program. Artifacts held by the Department, including those acquired from the Dawson Museum and Historical Society, will be recovered and catalogued. A consultant has been hired to investigate the best possible method of protecting and interpreting the Chilkoot Pass on the Canadian side of the summit. Based on this report, a development program will be prepared.

### NORTHERN ECONOMIC DEVELOPMENT BRANCH

#### Responsibilities

The Northern Economic Development Branch is responsible, on behalf of the Minister and the federal government,

for the effective management of oil and gas, mineral, water, forests and land resources and for developing the economy of the Yukon Territory and Northwest Territories. Its tasks are to seek out and identify all means whereby the economy of the North can be expanded at a more rapid pace, to develop a broad plan of economic progress, and to recommend, and in some instances manage, specific projects and policies for achieving this objective.

#### Review of 1970 Operations

Oil and gas expenditures in the Yukon Territory and Northwest Territories exceeded \$110 million in 1970, an increase of about \$30 million over the previous year. Most of the drilling and seismic exploration was concentrated in three geographic and geologic areas; the southern portion of the Territories, the Mackenzie delta-Tuk areas and the central Arctic Islands in the Sverdrup Basin.

Table 1 — Revenues Received, 1970

	Revenues (dollars)
<b>Yukon Territory</b>	
Permit Fees	1,750.00
Transfer Fees	Nil
Lease Fees	140.00
Rentals	182,448.00
Forfeiture	29,349.60
Bonus	Nil
<b>Total</b>	<b>213,687.60</b>
<b>Northwest Territories</b>	
Licence Fees	5,175.00
Permit Fees	141,250.00
Transfer Fees	56,350.00
Lease Fees	1,960.00
Rentals	3,315,524.09
Royalties	244,072.00
Forfeitures	661,828.60
Bonus	Nil
Miscellaneous	2,285.69
<b>Total</b>	<b>4,428,445.38</b>

Surface geological and photogeological surveys by the oil industry (measured in geological crew months) increased approximately 10 per cent over the previous year. The high level of this type of exploration program can be attributed to the participation surveys initiated by V. Zay Smith and Associates, and Geophoto Services Limited on the mainland of the Yukon and Northwest Territories; by J.C. Sproule and Associates on the Arctic Islands; and Pallister and Associates in carrying out their "Arcticquest" and "Polarquest" programs in the Arctic and surrounding waters.

Operation "Arcticquest" and "Polarquest" managed by Pallister and Associates carried out surveys over 350,000 square miles surrounding the Arctic Islands. Over 40 companies subscribed to 25 programs representing expenditures of about \$4 million for the first year of a four-year program. Programs in 1970 included field geological work, compilation of previous geologic, seismic, and other work, a bathymetric program, an aeromagnetometer program, a gravity program and the second phase of feasibility studies on Arctic offshore drilling under various types of ice conditions. It is expected that between 15 and 20 contractors will be involved in carrying out operation "Polarquest".

Seismic activity in 1970 increased by more than 40% over the previous year. A total of 230 seismic crew-months were recorded, including marine Mackenzie River programs. The magnitude of activities in seismic exploration indicates a high level of drilling in the future since it takes one to two seasons of seismic exploration to locate suitable drilling sites.

Exploration for 1971 is expected to increase at a slower rate than in previous years.

Oil companies undertook much of their seismic activity in the southern portion of the Northwest Territories south of Fort Simpson, and on the Peel Plateau. Imperial Oil Enterprises, Gulf Oil and Shell Oil continued to carry out large reflection seismic programs along the Arctic coastal plain on the mainland, and extensive marine seismic programs were carried out in the Mackenzie Bay and the Beaufort Sea areas. Panarctic Oils Ltd. and BP Oil & Gas Limited undertook extensive seismic programs in the Arctic Islands.

Drilling activity has increased dramatically in the past three years in the Northwest Territories and Arctic Islands. This, in part, can be attributed to fewer suitable exploration areas in the provinces, to the interest generated by the oil and gas discoveries on the Alaska North Slope areas, and to the start-up of a year-round road system in the Territories which allows the movement of equipment and supplies during 12 months of the year by conventional methods. The adaptation of drilling rigs to transportation by Hercules aircraft also has a bearing on the number of wells drilled during the summer months.

Imperial Oil continued to drill strategic tests in the delta and Tuktoyaktuk areas. Oil was discovered in one of the wells, Imperial Atkinson H-25. Imperial Oil in a press release stated that medium-gravity sweet oil flowed to the surface from the 5,700 foot level. The company has undertaken the drilling of two wells located approximately 3-1/2 and seven miles from the discovery well.

Oil and gas exploration in 1970 in the Yukon consisted of large-scale marine seismic surveys off the Arctic coast and the drilling of a wildcat well at Blow River. Western Minerals drilled a deep test on the Eagle Plain, but the well did not find commercial quantities of hydrocarbons and was abandoned.

The number of wells drilled and seismic crew-months worked will increase during 1971. Extensive seismic programs will be carried out in the Beaufort Sea and with ice-breaker assistance in the Viscount Melville Sound and Norwegian Bay

areas. The continuation of wildcat drilling in the Arctic by Panarctic, Sun Oil and BP, the wildcat drilling in the Delta areas by the major companies, and the participation drilling program by Horn River Resources will increase the number of wells drilled to at least 80 in 1971. Drilling activities and seismic programs will increase substantially in the other frontier areas and total exploration expenditures may exceed \$125 million in 1971.

**Table 2 – Number of Permits and Leases and Relevant Acreage – December 31, 1970**

<i>Area</i>	<i>Permits</i>	
	<i>No.</i>	<i>Acreage</i>
N.W.T. Mainland	2,353	107,746,820
Y.T. Mainland	627	26,722,941
Arctic Island (1)	5,212	256,838,300
Arctic Coast Marine (2)	908	48,274,444
	9,100	439,582,505
<i>Leases</i>		
N.W.T. Mainland	614	3,690,088
Y.T. Mainland	63	252,222
Arctic Island (1)		
Arctic Coast Marine (2)	673	3,942,310

(1) All areas North of 70°, onshore and offshore

(2) All areas South of 70°, covered by seacoast waters

#### **Panarctic Oils Ltd.**

In 1970 Panarctic Oils continued to carry out a large and comprehensive exploration program in the Arctic Islands. Additional farm-out agreements were concluded on low-priority drilling prospects, thus concentrating its efforts in meeting high-priority commitments on the more favourably located structures.

Geological surveys were continued on most of the central Arctic Islands, including Ellesmere Island. A three-month geophysical program was successfully completed by tracked vehicles in which a total of 210 miles of reflection seismic surveys was carried out on Ellesmere Island, Sabine Peninsula and the Hoodoo Dome Prospect.

The drilling phase of the program began in April, 1961 when two drilling rigs were flown to Melville Island by Hercules aircraft. A third rig, which had previously drilled a well on Bathurst Island, was reactivated.

Drilling will be continued with four rigs; one medium-size rig will be flown to the King Christian location to drill a 10,000-foot commitment well, and a third medium-size rig will be moved to Fosheim Peninsula on Ellesmere Island in April, 1971.

At the end of December, 1970 Panarctic Oils received total payments of \$13,522,500 from the federal government.

### Gas Purchase Agreement

The Westcoast Transmission Company and Amoco Canada Limited have signed a contract for dedication of the later company's gas reserves of the Beaver River Field, straddling the British Columbia-Yukon Territory and at Pointed Mountain in the southwest sector of the Northwest Territories, to the Westcoast Transmission Company.

The reserves approved and those developed in the Beaver River-Pointed Mountain area are needed by Westcoast Transmission to help in meeting additional market requirements expected over a 25-year period.

A contract has been let to construct a 24-inch gas pipeline to extend north for 110 miles from the present terminus of Westcoast Pipeline Company at Fort Nelson to the Beaver River gas pool. This project should be completed in early 1971.

The gas dehydrator plant and a gas gathering system in the Beaver River Field will be completed and in operation by November 1, 1971. Initial gas deliveries from Beaver River may exceed 200 MMcf/d. A second contract has been let to construct a gas dehydrator plant at Pointed Mountain and a connecting pipeline to Beaver River. This section of the gas gathering facilities will be operating by November 1, 1972.

When the development programs are completed it is likely that royalties from gas sales in the tri-corner of British Columbia, Yukon Territory and the Northwest Territories area will exceed one million dollars by 1975.

### Mackenzie Valley Pipelines

One of the major markets for Prudhoe Bay Oil is the north-central United States. The most direct route from Prudhoe Bay in Alaska and the Mackenzie delta area of Canada to the United States midwest area is along the Mackenzie Valley. A pipeline built along this route would provide transportation for oil reserves in northern Canada. Accordingly, a consortium of seventeen oil exploration companies and two oil pipeline companies was formed to determine the technologic and economic feasibility of constructing a 48"-diameter crude oil pipeline from the north slope of Alaska, up the Mackenzie Valley and on to Edmonton where it would connect with existing oil pipelines.

The initial research facility, a 2,000-foot test section of 48" pipe in an area of continuous permafrost near Inuvik, Northwest Territories, has been completed. Oil at 160°F is being circulated through this section. Initial indications are that it is technically feasible to construct oil pipelines over permafrost areas without causing undue damage. It was decided to continue the test facility at Inuvik until the end of 1971.

Extensive research is also being undertaken, directed largely on route selection and construction methods, with emphasis on ecology protection of the environment.

### Northwest Project Study Group

A group of oil companies and gas pipeline transmission

companies has formed a consortium to build, test and research facilities at Sans Sault Rapids on the Mackenzie River, in the Northwest Territories, and to study the feasibility of a proposed \$2.5 billion gas pipeline to central Canada and the mid-western United States. The Arctic test facility now under construction is part of the \$12 billion project to be undertaken by the Northwest Project Study Group.

Construction and operation of the facilities at Sans Sault is estimated to cost \$3.5 million. Under the program, engineers will:

- Test gas pipelines in permafrost under operating conditions.
- Test foundations for above-ground structures.
- Test the effect of a gas pipeline on surface cover.
- Study surface drainage problems.
- Test various materials and equipment and methods of pipeline construction.

Williams Brothers Canada Limited of Calgary are engineers for the research project and will supervise all testing at this Arctic test facility which is expected to be in operation for at least two years.

### Mining

The year 1970 saw a continuation of expansion in the mining industry that commenced in 1964 with the completion of the Great Slave Lake Railway.

In the Northwest Territories there are six producing mines, two open pit and four underground operations that treated approximately 4,500,000 tons of ore. Ore processed increased from 12,039 tons per day at the beginning of 1970 to 13,135 tons per day at the end of the year.

In the Yukon one large-tonnage lead-zinc mine increased its rate of production by 20 per cent and one gold-silver-lead mine came into production during the year. Ore processed increased from 10,325 tons per day at the beginning of the year to 14,950 tons per day at the end of the year. Total mineral claims recorded in the two territories amount to 26,093, which is a decrease of 9,248 claims over 1969. However, 53 Prospecting Permits were granted, bringing the total number of permits in existence to 127, covering 19.4 million acres of land.

### Yukon Territory

Exploration in the Yukon during 1970 shifted to a large low-grade copper-molybdenum deposit in the Casino Canadian Creeks area northwest of Carmacks.

United Keno Hill Mines Limited continued production at 270 tons of ore per day, with mill heads averaging 28 ounces

of silver per ton, with 4.5 per cent lead, 4.4 per cent zinc and 0.05 per cent cadmium. The Elsa and Calumet mines provide most of the 270 tons per day millfeed with some development ore from the Husky mine.

New Imperial Mines Limited continued production at a milling rate of 2,300 tons per day with mill heads averaging 1 per cent to 2.5 per cent copper from its open pit operations. A decision has been made to mine the downward extension of the Little Chief orebody and a decline shaft was driven 2,500 feet in 1970. The company produced over 16,000,000 pounds of copper during the year.

Cassiar Asbestos, located on Clinton Creek 50 miles northwest of Dawson, has exceeded its designed production of 80,000 tons of fibre per year. Fibre production has increased to 110,000 tons per year and a spinning fibre has been added to the range of products produced.

Venus Mines Limited, located on Windy Arm of Tagish Lake near Carcross, commenced milling in September, 1970 with a through-put of 254 tons per day. Reported ore reserves are 138,400 tons, grading 0.39 ounces of gold and 11.6 ounces of silver per ton.

Anvil Mining Corporation Limited, located 130 air miles northwest of Whitehorse, came into production in October, 1969. The mill capacity was raised to 6,600 tons per day capable of producing 370,000 tons of selective lead and zinc concentrates and 90,000 tons of lead-zinc concentrate annually. Dump trucks are used to haul concentrates to the railhead at Whitehorse, a distance of 240 road-miles. The containers are then transferred to railway cars at Whitehorse for shipment to tidewater at Skagway, Alaska.

Hudson Bay Mining and Exploration Limited, did extensive drifting (7,000 feet) all on one level during 1970 on its Tom claims at McMillan Pass on the Yukon-Northwest Territories border. Previous work established 5 million tons of mineralization running 16 per cent combined lead-zinc and 2.73 ounces of silver per ton. A decision will be made by early summer, 1971 regarding production plans following results of the underground diamond drill program.

Hudson-Yukon Mines Limited completed negotiations for the sale of nickel-copper concentrates from its property known as the Wellgreen Mine at Quill Creek. Earlier work established reserves of three-quarters of a million tons of ore, grading 2.04 per cent nickel and 1.4 per cent copper.

### Northwest Territories

There were 14,574 mineral claims recorded in the Northwest Territories in 1970, a drop of 4,509 from that in 1969 but, in addition, 53 prospecting permits were granted covering 9.4 million acres of mining land. Exploration activity shifted to the Arctic and Hudson Bay mining district, inland from Hudson Bay and in the Arctic Islands. This activity is expected to continue into 1970.

Considerable interest was shown in the silver occurrences in

the Great Bear Lake area, and in the East Arm of Great Slave Lake. Gold production from the gold mines in the vicinity of Yellowknife, dropped to \$11,686,310 in 1970 from \$12,381,240 in 1969.

Pine Point Mines Limited operated at a milling rate of nearly 10,500 tons per day, although the grade of ore mined dropped considerably since the mining of high-grade direct-shipping ore ceased in 1968. The value of mineral production was maintained because of the higher milling rate and an increase in the world price of both lead and zinc. An underground decline shaft was collared in November to begin mining the M-40 orebody. This test mining operation will determine the feasibility of operating other deep occurrences in this area.

Con-Rycon-Vol-Yellorex is currently engaged in a large underground expansion program. A shaft had been sunk from the 4,900 foot to the 5,600 foot level. Cominco and Yellorex have entered into an agreement whereby the Con Mine will develop and mine the Yellorex orebody, on a 50-50 basis of profit after expenses.

Giant Yellowknife Mines milled a tonnage that was approximately 7 per cent over that in 1969. However, due to a small decrease in grade and a lower selling price of gold the dollar value of production is down about 10 per cent. Milling rate at Giant is 1,160 tons per day including ore from Supercrest and LOLOR Mines.

Terra Mines and Exploration Company, located on Rainey Lake, 40 miles south of Great Bear Lake, brought its silver-bismuth property into production in September, 1969. The mill has a capacity of 300 tons per day. However, it is currently operating at 150 tons per day. Mill heads contain approximately 10 ounces of silver per ton of ore, and 1 per cent copper. The mill was shut down during February, March and April due to a fire that destroyed the crushing and screening unit. During this period underground development and stope preparation work continued.

Canada Tungsten Mining Corporation Limited, located 125 miles north of Watson Lake, Y.T., operates an open-pit mine on the Flat River in the Nahanni Mining District. Mining is only conducted during the summer months, and ore is stockpiled to permit year-round milling. Reserves totalled 733,823 tons tungsten-copper as at December 31, 1969.

Cadillac Mining & Exploration Co. Ltd. completed 3,680 feet of underground development work, 15,000 feet of diamond drilling and detailed geological studies in 1970, for a total expenditure of approximately \$2.5 million. Results indicate a deposit of 2 million tons of ore grading 13 per cent zinc, 11 per cent lead and 5 ounces silver per ton. Development will continue and the construction of a 1,000 tons-per-day mill is being considered.

The following table shows preliminary production figures for 1970 and comparative figures for 1969 for the Yukon and Northwest Territories. The forecast for the value of mineral production in 1971 from both territories is estimated at \$230,000,000.

<i>Northwest Territories</i>		1969	1970*
Gold	\$	\$ 12,381,240	\$ 11,686,310
	Ounces	328,502	319,560
Silver	\$	3,910,888	4,671,250
	Ounces	2,026,367	2,525,000
Copper	\$	643,761	631,100
	Pounds	1,251,723	1,086,800
Lead	\$	32,299,014	34,804,000
	Pounds	212,913,740	220,000,000
Zinc	\$	68,275,481	71,685,000
	Pounds	448,296,000	450,000,000
Cadmium	\$	675,136	526,400
	Pounds	191,800	140,000
TOTAL		\$118,185,520	\$124,004,060

#### *Yukon Territory*

Gold	\$	1,118,715	746,000
	Ounces	29,682	20,400
Silver	\$	5,182,166	7,890,250
	Ounces	2,685,060	4,265,000
Lead	\$	4,256,183	21,748,500
	Pounds	28,056,581	137,475,000
Copper	\$	7,645,623	9,000,800
	Pounds	14,866,077	15,500,000
Zinc	\$	5,035,385	24,846,900
	Pounds	33,062,280	155,975,600
Cadmium	\$	239,965	236,900
	Pounds	68,172	63,000
Asbestos	\$	11,924,526	15,173,000
	Tons	87,437	108,000
TOTAL		\$ 35,402,563	\$ 79,642,350

\*Preliminary Figures

#### **Development and Incentive Programs**

The major task of this section during the year was the administration of the Northern Roads and Airports Program. Its secondary function was to administer the Northern Mineral Exploration Assistance Program and the incentive programs related to access road and airstrip construction assistance.

*The Northern Roads Program*, approved in 1965, provides for a ten year \$100-million program to construct roads which connect centres of population and provide access to areas of resource potential.

The following list shows major expenditures on new roads being constructed under this program during the year.

Campbell Highway	\$ 550,000
Dempster Highway	1,700,000
Carcross-Skagway Road	414,000
Mackenzie Highway	1,600,000
Fort Smith Highway	214,000
Fort Resolute Road	190,000
Fort Simpson-Fort Liard Road	2,000,000

In addition approximately \$1,300,000 was spent on reconstruction of existing roads in the Yukon and Northwest Territories.

Moreover, \$762,286 was paid out to recipients of *Northern Resource Roads* assistance in respect of access roads constructed to mine properties or exploration sites.

*Tote Trail Assistance*, amounting to a total of \$150,000, was paid to resource developers for construction of low-standard roads to gain access to the site of their operations.

*The Northern Resource Airports Program* provides for financial assistance, on a cost-shared basis, for the construction of airports intended to provide access to resource exploration and development projects. A total of \$160,000 was provided in estimates for this purpose.

Twenty-six applications were approved under the *Northern Mineral Exploration Assistance Program* which is designed to offset as much as 40% of an applicant's approved exploration expenditures. Grants in the year were graduated in increments of ten, from a minimum of 20% of expenditures to a maximum of 40%, depending on the geographic location of the exploration program. A total of \$498,061 has been committed in assistance payments to successful applicants.

#### **Water- and Land-Use Management**

During 1970, the water section expanded its terms of reference to take on the administrative responsibility for the Northern Land-Use Regulations.

With respect to water, the Northern Inland Waters Act and Arctic Waters Pollution Prevention Act were passed by Parliament in June, 1970, as the main working legislation for the section for managing the water resources of the North, including pollution control. The last half of the year was devoted to preparing regulations, organizing the build-up of field staff and facilities and setting up Water Boards, which will be the decision-making bodies for water management in each territory. The section continued its responsibility for administering the Dominion Water Power Act and collecting land and water rental for licenced hydro developments in the national parks and the North.

An amendment to the Territorial Lands Act to permit promulgation of Northern Land Use Regulations and establishment of land management zones was approved by Parliament in June, 1970. Development of the regulations was well advanced by the end of the year and additional staff hired for their implementation. Until the regulations go into effect, the section is working closely with the petroleum industry in drawing up individual agreements with oil and gas exploration permittees to control land-use operations. The agreements contain clearly defined stipulations on land use that are to be followed by the exploration companies, subject to inspection by section personnel located in the North.

#### **Forest Management**

The forest survey program in the Territories was continued in 1970, with four new survey contracts being awarded to private forestry consultant firms. These projects, covering the Lower Liard River in the Northwest Territories and the Upper Liard, Pelly and Tagish areas in the Yukon Territory, will continue into 1971 and will provide additional data for the establishment of timber harvesting units and allowable cut

levels. This information, along with an evaluation of forest site capability, will form the basic framework for the allocation of timber cutting rights and the identification of alternative forest land values.

The Department acquired the Department of Agriculture experimental farm station in the Yukon, which will be developed as an experimental forest nursery and resource management training centre. The initial phases of this new program will be developed during 1971.

*Forest Protection.* The Yukon Territory experienced a record low in area burned during the 1970 fire season, with 119 fires burning a total of only 261 acres; of this, 115 fires burned 218 acres in the protected zone. The light season resulted from favourable weather conditions, below normal lightning activity and improved initial fire-attack capability.

In 1970, the Mackenzie District of the Northwest Territories experienced a very difficult fire season south of Great Slave Lake, with extreme fire hazard conditions and above-normal lightning storm activity throughout the summer. The Liard and Mackenzie Valleys escaped with a lower than normal incidence of fires. There were 146 fires in the protected zone, 74% of which occurred south of Great Slave Lake, and the total area burned was 465,131 acres. In the non-protected zone in the Mackenzie, an additional 33 fires burned an estimated 47,000 acres but there was no direct fire-control action taken.

*Timber Production.* The level of timber production in the Territories in 1970 remained at approximately 20 million board feet. There continued to be increasing interest by forest industry firms in establishing timber operations in the North, but limited local markets have restricted any major increase in production.

*Campsites and Picnic Grounds.* The Department continued to contribute towards the campsite programs in both Territories, but in the Mackenzie District the territorial government assumed full responsibility for the program on April 1, 1970. The Department maintained operational responsibility for campsites in the Yukon in 1970 but the Yukon territorial government will take over this program in 1971. Cost-sharing arrangements will continue in both Territories.

#### **Canada Lands**

In 1970 the revenue derived from the lease, sale or other disposal of lands in southern Canada and the Yukon and Northwest Territories amounted to approximately \$270,000.

The first of the "Development Control Zone" transfers was completed in 1970. These "Zones" define the lands within and immediately surrounding the settlements in the Yukon and Northwest Territories. Pursuant to the recommendations of the Carrothers Commission they were transferred to the administration of the territorial governments in order to give the Territories greater autonomy through the control of municipal development in concert with the local councils. The 1970 transfers involved the City of Whitehorse in the Yukon, the City of Yellowknife, the Town of Inuvik and Rae, Frank Channel and Edzo in the Northwest Territories. The remaining

communities will be dealt with over the next five years in accordance with priorities set by the commissioners of the Territories. As well, some 75 separate parcels of land in various communities in both the Yukon and Northwest Territories were transferred to the administration of the territorial governments for specific purposes.

In the two northern territories 105 reservations were established to accommodate installations of other federal departments and agencies engaged in the supply of essential services for northern residents, and 25 obsolescent reservations were cancelled in order to permit alternative, beneficial use of the lands for public purposes. Five large tracts of land at Lincoln Bay, Wrangel Bay, Tanquary Camp and Hazen Camp, on Ellesmere Island, and on Ward Hunt Island, were reserved for special studies in the fields of meteorology, glaciology, oceanography, geology, biology and archaeology, which are being carried out under the auspices of the Defence Research Board.

Five applications to lease lands on Banks Island, on Bathurst Island and at several locations along the northern coast of the Northwest Territories, for the purpose of establishing staging areas and supply depots servicing companies carrying out oil exploration activities in the high Arctic, have been endorsed by the Transportation Sub-Committee of the Advisory Committee on Northern Development and are now being processed. A similar project, planned by Arctic Lifeline Ltd in 1969, has not progressed satisfactorily and it may become necessary to terminate the lease.

Oil and gas pipeline testing facilities have been set up by Canadian Bechtel Limited and Williams Brothers Canada Limited on leaseholds at Inuvik and at the Sans Sault Rapids on the Mackenzie River. The Alberta Gas Trunk Line Company is going to undertake the construction of another installation in the vicinity of Norman Wells.

In southern Canada, title research was carried out to ratify Departmental ownership of 37 properties and they are now being utilized productively.

By transfer from other federal departments, 29 properties of considerable value were acquired and 9 comparable parcels, valued in excess of \$2 million, were made available to agencies at the various levels of government and to educational and religious organizations without financial compensation.

In excess of 50,000 documents and records covering grants of former Dominion Lands in western Canada were indexed, catalogued and microfilmed. This enables photocopies of such material at letters patent, Métis scrip, military bounty warrants, South African veteran's land claims, Hudson's Bay Company notifications and Royal Canadian Mounted Police land warrants to be produced.

For historical research projects, 27 abstracts of title relating to land settlement were compiled, 93 certified true copies of documents were made available for the same purpose, and thousands of general enquiries on land matters were answered.

## Economic Staff Group

### Responsibilities

The Economic Staff Group provides advice on the northern economy to senior departmental management and undertakes research and studies on matters which relate to the economic development of the North.

Functionally, the group is divided into two sections. The Resources and Transportation Section is concerned with the development of renewable and non-renewable resources, and transportation systems in the North. It undertakes research and studies in this connection, and is responsible for developing appropriate policies and programs regarding resource development and the provision of an adequate transportation network for the North. The Regional Planning and Manpower Section is responsible for conducting research and studies on problems related to regional economic and policy planning, and pertaining to demographic and labour force matters arising from the development of northern industry and the employment of northern residents.

### Review of 1970 Operations

During 1970, the Economic Staff Group conducted a variety of research projects and studies and undertook several projects with private consultants on behalf of the Department. While the projects covered a variety of subjects, the formulation of a strategy for the development of the northern territories and the establishment of national objectives with respect to the North were accorded top priority in the Group's work program.

The Resources and Transportation Section undertook a number of cost-benefit studies, including an evaluation of a bridge crossing the Yukon River at Dawson and an evaluation of the feasibility of bringing an iron mine into production of Baffin Island. A transportation study relating to supplying Arctic islands exploration sites was initiated. In collaboration with the Ministry of Transport, a study was carried out by consultants of various alternative north-south rail routes through northern British Columbia to the Yukon. A study was also carried out within the section to determine the level of non-resident ownership in the mining and oil and gas industries in the North.

Most of the research undertaken by the Regional Planning and Manpower Section was designed to extend work on the strategy for northern development and to provide information and research results which would be useful in the process of implementing the strategy. Research work was begun on the construction of a regional social accounting system that can be used to organize and present the kind of economic information which is required for regional planning in the northern territories. Several studies were undertaken by consulting firms. They included a study of the impact of oil exploration and production activities in the Mackenzie delta area, the development of an appropriate model for evaluating economic development proposals for the North, and an evaluation of agreements between industry and government regarding the employment of northern residents in resource industries.

## NORTHERN SCIENCE RESEARCH GROUP

### Responsibilities

To sponsor and conduct research into both physical and human problems of northern development; to encourage and support such research by non-government agencies; to collect and disseminate scientific information, and to operate the Inuvik Research Laboratory.

### Long-term Plans

To assist in the development of the Canadian North by encouraging scientific investigation; to provide advice and research services to organizations within the department; to co-ordinate the collection of information on Arctic developments outside Canada; to formulate detailed research programs and to arrange for their implementation.

### Review of 1970 Operations

The program of northern research continued in 1970 with some expansion of technological studies, although the emphasis remained on social science. About fifty per cent of the research projects were undertaken by university scientists and graduate students working under contract or in seasonal employment. The main component of the total program was the Mackenzie Delta Research Project designed to identify and analyse the social and economic conditions which impede the participation of northern people in the development of their country. The data and analyses obtained will be made available on a continuing basis to those engaged in socio-economic development.

### *Research Projects Carried Out Or Directed By the Group*

#### A) Projects by officers of the group:

- Examination of problems relating to aboriginal land claims in Northern Canada. Preparation of a paper for consideration by Cabinet. Continuing in 1971.
- Summary and analysis of U.S.A. proposals to resolve aboriginal land claims in Alaska, as possible precedent for Canadian decision. Continuing in 1971.
- Canada-U.S.S.R. Industrial Exchange Agreement Preparation for signing of agreement by Minister of Industry, Trade and Commerce in Moscow, January 27, 1971. Follow-up continuing 1971.
- Analysis of trapping and hunting economy of Banks Island, with reference to resource use and environmental problems. Completed for publication.
- Historical list of Arctic trading posts, 1870-1970, with explanatory text. Continuing in 1971.
- Handbook of water utilities, sewers and heating methods used in Soviet North. Translated from Russian. Completed for publication.

- Inventory of municipal services in settlements of N.W.T. Continuing in 1971.
- Selective bibliography of water supply and waste disposal methods in cold climate regions. Continuing in 1971.
- Modernization in Greenland, a study of Danish approach to urbanization, and comparison with Canadian experience. Continuing in 1971.

#### B) Projects by contract employees:

- Adaptation of Indian people to urban life in Vancouver. Continuing in 1971.
- Study of Eskimo adaptation to and policy administration of northern rental housing program. Completed for publication.
- Occupational aspirations among students of various ethnic groups in high schools of the N.W.T. Continuing in 1971.
- A dictionary of the Dogrib language, with particular reference to an educational project at Fort Rae. Completed.
- Social science survey of Indian migrants from reservations to Edmonton skid row district. Completed for publication.
- Analysis of the writing of explorer-missionary Emile Petitot, concerning the aboriginal peoples of the Mackenzie delta. Completed for publication in French and English.
- Anthropological study of social change among Indians of Ross River, N.W.T., with emphasis on problems of adaptation to wage employment in mining industry. Continuing in 1971.

#### *Grants Program For Northern Research Institutes And Scientific Research Expeditions*

In 1970, the ninth year of this program of assistance to institutes and expeditions, amounts totalling \$200,000 were awarded, as recommended to the Minister by a grants committee. Through this grants program, a large number of northern research projects were supported in a wide variety of scientific disciplines. Grants were made to:

Arctic Institute of North America  
 Arctic Studies Group (Université de Montréal)  
 Boreal Institute (University of Alberta)  
 Canadian Research Centre for Anthropology (University of Ottawa)  
 Centre d'Etudes Nordiques (Université Laval)  
 Committee on Northern Studies (University of Manitoba)  
 Committee on Arctic and Alpine Research (University of British Columbia)  
 Institute for Northern Studies (University of Saskatchewan)

President's Committee on Northern Area Studies (Lakehead University)  
 Committee for Arctic & sub-Arctic Research (University of Toronto)  
 Arctic Studies Conference (Université Laval)  
 Institute of Social and Economic Research (Memorial University)  
 McGill Committee for Northern Research (McGill University)  
 The Devon Island Expedition (Arctic Institute of North America)  
 The Icefield Ranges Research Project (Arctic Institute of North America)

#### *Grants to Universities For Applied Research, Meeting Specific Requirements Of This Department*

This program of grants was initiated in 1969-70 with a fund of \$50,000. Its purpose is to support research in problem areas specified by the Department of Indian Affairs and Northern Development. Grants were made to:

- Faculty of Architecture, Urban and Regional Planning Group, University of Toronto. (Study of northern town Planning.)
- Faculty of Engineering, University of Ottawa. (Study of biotic effects of oil fractions on tundra vegetation.)
- Department of Geography, University of Saskatchewan. (Study of uses of caribou resource.)

A grant of \$30,000 has also been made to the Arctic Institute of North America for the publication of the Arctic Bibliography. All research supported by the applied grants program continues into the following year.

#### *The Scientific Research Laboratory, Inuvik, Northwest Territories*

This facility, opened in 1966, provides general laboratory and other facilities to support a variety of scientific disciplines. The laboratory includes a cosmic-ray measurement annex, low-temperature rooms, photographic dark room, library, seminar room, offices and general or special laboratories. Approximately 300 investigators and 300 scientific projects were supported by the laboratory staff during 1970. Several abandoned intermediate DEW line stations have been reserved for use, as required for scientific research.

#### **Plans for 1971**

##### **Oil and Gas**

Drilling activities in the southern portion of the Northwest Territories may decrease over the next year or two due to lack of encouragement from oil and gas discoveries. Marine seismic surveys in the Beaufort Sea and inter-island waters will increase substantially during the current year if ice conditions are favourable. Ice-breaker supported seismic programs will be carried out in the Viscount Melville Sound and Norwegian Bay areas.

Imperial Oil, Gulf Oil, and Shell Oil will continue seismic and drilling operations in the delta and coastal areas.

The Arctic islands drilling program will increase this year with the addition of four more drilling rigs. It is expected that the eight rigs on the islands will drill between 12 and 15 wells in 1971.

The Eagle Plain area in the Yukon has been reactivated by Chevron Standard. It is expected that at least six wells will be drilled before the end of the 1971-72 winter season.

Proposed operations for 1971 call for additional geological surveys in the Sverdrup Basin, and seismic programs to evaluate drilling prospects for 1971-72.

#### **Mining – Yukon Territory**

Hudson Bay Mining and Smelting will continue with underground development and surface construction work on its Wellgreen property near Burwash Landing at Mile 1,111 on the Alaska Highway. This property is scheduled to come into production early in 1972. The company is also continuing with engineering studies on its lead-zinc property near Mac-Millan Pass on the Canol Road.

New Imperial Mines plans to continue with underground development work to mine by underground methods the downward extension of the Little Chief orebody.

Brameda Resources with the Tech Corporation will proceed with further exploratory work on the molybdenum-copper deposits in the Casino Creek area. Several other companies in this area will, in all likelihood, continue with exploratory work, including diamond drilling.

#### **Mining – Northwest Territories**

Norex Resources Ltd. is expected to mine its highgrade silver property, on a small tonnage basis, in the Camsell River area.

Federated Mining Co. Ltd. has optioned the old Camsell River silver mine and expects to commence high-grading operations in the upper levels of the mine.

Copper Pass Mines Ltd. is expected to mine a small tonnage of high-grade nickel ore on its property on the east arm of Great Slave Lake.

Jason Explorers is also expected to mine and ship a small tonnage of high-grade nickel-cobalt ore from its property on Simpson Island in Great Slave Lake.

Cadillac Explorations Ltd. is expected to continue with underground exploration and diamond drilling on its lead-silver property in the Nahanni area.

Cominco Ltd. who has taken an option on a silver-copper property in the Hackett River area southwest of Bathurst Inlet, will continue its diamond drilling program during 1971.

#### **Development Analysis**

Proposed revisions to the Northern Roads Policy will be forwarded to Cabinet for approval. The proposed revisions will bring the program in line with present day conditions.

The Northern Roads and Airports Program administration will continue into the new year at approximately the same level of expenditure as in the two former years.

The administration of the Northern Mineral Exploration Assistance Program will continue at the same level of funds as were available in 1970.

The use of the incentive programs will be stressed in 1971 to encourage the development of resources in the North, so as to provide permanent employment for northern residents.

#### **Water- and Land-Use Management**

During 1971, it is planned to complete the regulations under the Northern Inland Waters Act and recruit sufficient field staff to be able to put the Act into effect. Similarly, an Order-in-Council to implement the Northern Land Use Regulations will be passed in time for winter explorations activities.

The ALUR program for 1971 will involve a continuation of research in most areas begun during 1970, plus new efforts in the areas of off-road transportation problems and terrain sensitivity mapping.

#### **Forest Management**

Timber disposal policies will be further reviewed and the Territorial Timber Regulations will be revised to provide for long-term timber harvesting rights and proper forest management practices.

Forest-fire protection will be continued, but with greater emphasis being placed on protection of productive forest land. Aerial fire-bombing capability will be established in both Territories in 1971.

The four new survey contracts, which were awarded to private forestry consultant firms in 1970 and will continue into 1971, cover the Lower Liard River in the Northwest Territories and the Upper Liard, Pelly, and Tagish areas in the Yukon Territory.

They will provide additional data for the establishment of timber harvesting units and allowable cut levels. The information, along with an evaluation of forest site capability, will form the basic framework for the allocation of timber cutting rights and the identification of alternative forest land values.

The Department recently acquired the Department of Agriculture experimental farm station in the Yukon, which will be developed as an experimental forest nursery and resource management training centre. The initial phases of this new program will be developed during 1971.

#### **Campsites and Picnic Grounds**

The Yukon territorial government will take over operation responsibility for campsites in the Yukon in 1971. Cost-sharing arrangements will continue in both Territories.

#### **Canada Lands**

Canada Lands continues to administer resource lands in the Yukon Territory and Northwest Territories, together with the residual interest of the federal government in many parcels of public lands in southern Canada, and to assist in measure to stimulate more aggressive agricultural, recreational and commercial development of these areas.

Pursuant to Treasury Board Minute No. 685141 dated January 23, 1969, and as part of the transfer of the Development Control Zones to the administration of the Northwest Territories, hundreds of administrative and educational sites in the Northwest Territories, including the apartment buildings and service installations, will be transferred to the management and control of the commissioner to facilitate integrated local government.

The Development Control Zones define the lands within and immediately surrounding the settlements in the Yukon Territory and Northwest Territories which are scheduled to be transferred to the administration of the territorial governments pursuant to the recommendations of the Carrothers Commission. This transfer enables each of the two Territories to have greater autonomy through the control of municipal development in concert with the local councils. During 1971, action will be taken to confirm the boundaries of the Development Control Zones for Faro, Frobisher Bay, Fort Smith, Fort Providence, Aklavik, Fort Simpson and Hay River, and to effect the transfer of the administration of the lands within these zones to the territorial governments. The remaining communities not previously dealt with will be processed over the next five years in accordance with priorities set by the commissioners.

Authority may be requested to delegate signing authority to execute land transaction documents concerning lands in the Northwest Territories to the Regional Director of Resources at Yellowknife late in 1971 or early in 1972, when it is expected that the transfer of the Development Control Zones for the larger and more active settlements in the Mackenzie District will be completed. Coupled with this action will be the decentralization of responsibility for the drafting of leases, sale agreements, notifications to issue title, etc., to the office of the Supervisor of Lands also at Yellowknife.

Arrangements are being completed for the appointment of the district foresters at Hay River, Inuvik, Fort Smith, Fort Simpson, Yellowknife and Norman Wells as land agents to process land applications outside of the Development Control Zones, and to replace territorial government employees currently doing this work on our behalf.

Planning in connection with a number of the Eastern Arctic settlements will be completed during the coming year and additions to existing residential and commercial subdivisions throughout the Territories will also be finalized.

It is anticipated that better than 200 surveys will be carried out on behalf of the federal and territorial governments and the general public to meet the growing demand for residential and commercial lands, and to accommodate installations necessary to meet the increase in mining and oil and gas exploration activities.

A land title review to determine the number of properties in the provinces which are still under the administration, management and control of the Northern Economic Development Branch will be continued. Limitations on staff, notwithstanding, efforts will be made to complete up to 35 fully documented abstracts of title. The lands so identified will be

made available to other federal, provincial or municipal governments for public purposes first, after which efforts will be made to secure optimum revenue from the lease or sale of the remaining lands and buildings.

Negotiations will be carried out by free transfer from other federal departments, for the acquisition of a number of properties in both northern and southern Canada which are essential for departmental purposes. Reciprocal arrangements will be made concurrently to implement transfers of some of our own surplus holdings to agencies which have continuing requirements for the installations concerned.

### **Economic Staff Group**

A number of socio-economic studies have been planned to be undertaken in 1971, either by the Economic Staff Group or by consultants. These include:

- the development of a system of economic accounts for the North;
- an examination of possible alternative policy instruments for use in implementing northern planning and co-ordination;
- an examination of manpower supply and demand with a view to establishing a method for projecting the requirement for manually operated equipment.
- an examination of incentive programs for northern development;
- the development of an overall policy for electric power in the Yukon and Northwest Territories;
- a study of the possible alternatives for long-term transportation development in the Mackenzie River area;
- a study of the impact of proposed alternative pipeline routes from Prudhoe Bay to Southern Canada on the regions adjacent to the proposed routes.
- an examination of the impact of proposed taxation change on the North.

Many of the studies that are to be undertaken will provide information in the preparation of the strategy for northern development.

### **Northern Science Research**

Ten of the projects described above will continue to completion in 1971. An additional project is the production of a new school text emphasizing the role of Indians and Eskimos in the history of the Canadian Arctic. As in previous years, the group will provide information and consultation services on northern development.

## TERRITORIAL AFFAIRS BRANCH

### *Territorial Division*

#### Responsibilities

To act for the federal government in the negotiation and administration of federal-territorial financial arrangements with both Territories.

To review both Yukon and Northwest Territories fiscal and legislative programs and development plans and to advise the Deputy Minister on policies relating to the administration of the Territories.

To act as liaison between the Department of Indian Affairs and Northern Development and the governments of the Yukon and the Northwest Territories in respect to residual federal functions not related to natural resources.

To provide advisory services to the Yukon and the Northwest Territories in respect to the administration of government in the two Territories.

To co-ordinate the transfer of government functions and services to the governments of the Yukon and the Northwest Territories under the jurisdiction of the federal government.

#### Long-term Plans

To develop long-term federal-territorial policy and fiscal arrangements with both the Yukon and the Northwest Territories and to assist the governments of the two Territories in the exercise of their responsibilities and in the development of a more responsible form of government. To support territorial fiscal programs and legislative policy proposals.

#### Review of 1970 Operations

Amendments to the Yukon Act and the Northwest Territories Act were passed by Parliament on June 26, 1970. These increased the life of the territorial councils from three to four years; authorized the Commissioners-in-Council to prescribe the qualifications of persons who may vote or be elected in territorial council elections and to legislate on matters relating to the administration of justice. The Commissioners-in-Council were also empowered to set the indemnities and allowances of council members. The period during which territorial ordinances may be disallowed by the federal government was reduced from two years to one year.

In the case of the Northwest Territories the size of the council was increased from 10 to 14 members. It now consists of 10 elected and four appointed councillors.

Financial assistance to the governments of the Yukon Territory and the Northwest Territories was appropriated in 1970-71 in the following amounts:

#### a) *Financial Agreements*

	<i>Yukon Territory</i>	<i>Northwest Territories</i>
Operating Deficit Grant	\$4,063,800	\$26,598,000
Capital Loans	4,911,600	10,207,500
Amortization Grant	1,678,000	2,209,000

#### b) *Additional Financial Assistance Outside the Agreements*

##### *Yukon Territory*

Second Language Training Grant	\$133,000
Dawson Water System Purchase Grant	420,500
Contribution-Hospital Care of Indians and Eskimos	104,800
Contribution-1st Mortgage Low-Cost Housing Subsidies	25,000
Contribution — Squatter Removal from Whiskey Flats	15,000
Low-Cost Housing Mortgage Loans	400,000
Second Mortgage Loans to residents	50,000
Riverdale Subdivision Loan	350,000
Anvil Townsite Loan	180,000
Whitehorse Water and Sewer Loan	150,000

##### *Northwest Territories*

Arctic District Transfer Grant	\$13,042,092
Contribution-Hospital Care of Indians and Eskimos	719,200
Contribution-1st Mortgage Low-Cost Housing Subsidies	20,000
Territorial Rental Housing Loan	900,000

The division co-ordinated the negotiations for federal-territorial financial agreements to commence April 1, 1971 for both Territories.

Liaison was established with the Northwest Territories government by the stationing of a special officer at Yellowknife early in 1970.

The division provided advisory service on territorial affairs, and on the completion of the transfer of territorial functions performed by the Department of Indian Affairs and Northern Development in the Arctic District to the Government of the Northwest Territories in Yellowknife. The administration of territorial hospital insurance services for the Northwest Territories and of workmen's compensation was transferred to the respective territorial governments.

The Arctic District schedule of transfer was as follows:

November 1, 1969	Welfare
December 1, 1969	Industrial Supply Engineering (O&M)
April 1, 1970	Northern Housing Personnel Finance Education
August 1970	Teaching staff

**Plans for 1971**

The administration, co-ordination and supervision of a one-year financial agreement which commences April 1, 1971 for both Territories will be carried out under the following terms:

	<i>Yukon</i>	<i>NWT</i>
Operating Grant	\$6,890,000	\$48,864,800
Amortization Grant	2,635,800	3,194,000
Capital Loans	5,009,000	16,381,000
Loans for relending to third parties (outside agreement, NWT only)	—	1,503,000

Research into possible new procedures for federal financial assistance to the territorial governments is being undertaken and the proposals for special rights for the original inhabitants of northern Canada are being investigated.

*Northern Services Division***Responsibilities**

The Northern Services Division brings together various responsibilities for the administration of special programs for territorial residents, either on behalf of the government of the Northwest Territories or representing residual federal responsibilities. The division operates through three major sections, the Eskimo Services Section, the Education Section and the Employment Liaison Section.

The Eskimo Services Section provides specialist advice on diverse matters relating to Eskimos and northern subjects generally. These include a translation service in the Eskimo language, the publication of an Eskimo magazine, and also through its fine arts group and the use of the Department's arts and crafts collection, the promotion of the image of Canadian Eskimo art and culture. In addition, this section administers the reviving Eskimo Loan Fund, the Eskimo Small Boats Grant Scheme and provides assistance to a central marketing agency for northern arts and crafts.

The Education Section provides a staff of specialists responsible for counselling, training arrangements, relocation and employment assistance for Eskimos in southern Canada. As well, it operates the Departmental education facilities at Fort Churchill, Manitoba.

The Employment Liaison Section provides liaison with resource-development industries, labour unions, federal departments and territorial governments, designed to ensure that northern residents have every opportunity to share in and benefit from the development of the North. The section has staff both in Ottawa and in the field.

**Long-term Plans**

The Northern Services Division will continue to provide specialist advice on diverse matters relating to Eskimos and

northern matters generally. It is intended to expand activities in the field of Eskimo cultural development, and also to ensure that the government's objective pertaining to increased training and employment opportunities for northern residents is attained.

**Review of 1970 Operations**

The Eskimo Loan Fund continued in operation in 1970 with \$93,673.95 in loans being approved as well as one grant for \$9,000 under the Small Boats Scheme. The Eskimo Arts Council was supported in the mounting of one major international Eskimo Art exhibit (the Masterworks of the Canadian Arctic) and the Department collection was shown in various locations at home and abroad. The reorganization and re-financing of Canadian Arctic Producers, a central marketing agency for Eskimo arts, were completed with the Department underwriting \$400,000 in \$1 par value seven per cent redeemable preferred shares.

The operation of the federal school complex at Fort Churchill continued, as well as an Eskimo-language school at Rankin Inlet. The school complex had an enrolment of 440 students and divisional counselling and placement people provided a service to 120 students in southern Canada.

The Employment Liaison Section negotiated agreements for the employment of northern residents with Pine Point Mines, Canada Tungsten and Texas Gulf Sulphur. Increasing acceptance of this program was evidenced by the oil industry sponsoring a workshop for staff of the territorial government, Canada Manpower and this Department aimed at furthering this program.

**Plans for 1971**

The Northern Services Division will continue to operate and improve on existing programs and develop plans for the provision of special programs needed to assist northern residents to attain their place in the mainstream of Canadian society.

The Employment Liaison Section will establish, at Whitehorse and Yellowknife, additional staff and committees with representatives from government, industry and local residents to discuss ways and means of creating more training and employment opportunities for northern residents.

## DEPARTMENT OF JUSTICE

### Responsibilities

To appoint judges to the Territorial courts, and to direct and conduct court proceedings on behalf of the Crown, including prosecutions under the Criminal Code and other federal statutes.

### Review of 1970 Operations

During 1970-71, the Yukon Territory and the Northwest Territories assumed additional responsibility for the administration of justice within the Territories. The staffs of the Territorial and magistrate's courts are now functioning as employees of the Territorial governments concerned. The Crown prosecutor and members of his staff remain federal employees and salaries and expenses are paid from federal funds.

### Plans for 1971

Negotiations are now being carried on with the governments of the two Territories with a view to establishing a shared-cost legal aid system which would embrace both civil and criminal matters.

## DEPARTMENT OF MANPOWER AND IMMIGRATION

### Responsibilities

The fundamental purpose of the Department is to further the economic growth of Canada by endeavouring to ensure that the supply of manpower matches the demand qualitatively, quantitatively and geographically; and to assist in the development of the Canadian economy by encouraging a flow of desirable immigrants, adaptable to the needs of the country, and by controlling the entry or stay in Canada of non-immigrants.

### Long-term Plans

The services of the Department will be extended to reach those people living in outlying areas who, at present, are not able to participate fully in the services offered by the Department. Itinerant services are proposed for these remote areas.

The long-term plans of the Department's northern offices continue to be to determine the manpower needs of northern employers and to arrange for suitable training courses for workers resident in the North in order that their job qualifications might be acceptable to these employers.

### Review of 1970 Operations

#### General

In August of 1970, a full-time office was opened at Inuvik. The latter, along with offices at Whitehorse and Yellowknife, brought to three the number of full-time offices serving the far North. In addition, itinerant service was provided to communities such as Fort Smith, Coppermine, Chesterfield Inlet, Cambridge Bay and others.

A total of 11,983 workers and employer clients requested assistance last year, either to seek employment or to recruit workers. Of the clients seeking work, 2,733 were placed in regular employment. However, many worker clients lacked either the basic education or skill level to take advantage of existing opportunities. Consequently, the provision of counselling services continues to be of prime importance because of the very special problems of people residing in isolated communities whose experience of modern industrial life styles is, at best, limited and superficial.

### Training

In 1970, training courses were available in both the Yukon and Northwest Territories. Courses geared to the present and future economic needs of the expanding economy are producing graduates trained as heavy-equipment operators, welders, carpenters, forest protection officers, nursing assistants, and clerk typists to name a few. Moreover, there was a substantial increase in training courses for basic skill development and certain specialized skill courses, such as, big-game guiding, fire control forestry service training, and cargo handling. This year, an experiment in the use of a mobile classroom proved most successful and a basic mine prospecting course was given using this facility.

Most clients referred to training were required to travel to other areas and mobility assistance was provided for these trainees.

In the North there is an acute awareness of the lack of skilled workers. Consequently, employers are receptive to the training-in-industry concept which is implemented through the Canada Manpower Training Program. Under this program, employees have been exposed to industry-based courses, most of which were related to the primary industries in oil and mining explorations, and lumber operations areas.

### Frobisher Bay

Services of this Department were delivered to the public by representatives of the Territorial government, Northwest Territories. In this regard, 47 persons were referred to Basic Training for Skill Development, 67 to skill training and 7 to apprenticeship courses.

### Immigration Activity

In 1970, a total of 205 persons admitted to Canada as immigrants gave their destination as being either the Yukon or the Northwest Territories. Of this number, 109 were destined for the labour force and the remainder (96) were dependents.

### **Jurisdictional and Operational Responsibilities**

In the year under report, jurisdictional and operational responsibilities for Departmental services in the Canadian North were clarified:

- The area officially defined as the Yukon Territory would come under the jurisdiction of the Director General, Pacific Region, Department of Manpower and Immigration, 1155 West Pender Street, Vancouver 1, B.C.
- The area officially defined as being in the Northwest Territories, i.e., the Districts of Mackenzie, Keewatin, and Franklin, would come under the jurisdiction of the Director General, Prairie Region, Department of Manpower and Immigration, Royal Bank Building, 220 Portage Avenue, Winnipeg, Manitoba.
- The Director General, Quebec Region, Department of Manpower and Immigration, 550 Sherbrooke Street, West, Room 524, Montreal 2, Quebec, is responsible for the area in Northern Quebec.

### **Plans for 1971**

#### **Yukon Territory**

Contingent upon development of the mining industry, efforts will be expanded to promote the hiring of local workers in Yukon mines.

The identification of areas where it is feasible and practical to take training courses to potential trainees will be continued. In this regard, the help of the Yukon Native Brotherhood will be solicited.

#### **Northwest Territories**

##### *General*

Liaison with the Territorial government will be increased in order that there may be an effective information exchange covering the economic outlook, manpower requirements and other related data which may influence the provision of service by this Department. Moreover, it is anticipated that a high level of training activity will be maintained in order to achieve maximum utilization of the northern labour force.

##### *Frobisher Bay*

It is expected that itinerant services to Frobisher Bay and some other communities of the Eastern Arctic, will be expanded.

## DEPARTMENT OF NATIONAL DEFENCE

### CANADIAN ARMED FORCES

#### Responsibilities

To support Canada's national policies by contributing to the maintenance of Canadian Sovereignty.

All aspects of maritime, land, and air defence. In some areas these tasks are done in co-operation or shared with our allies under international agreements.

To provide search and rescue services.

To assist other government departments and civilian agencies in national development projects and in time of civil emergencies.

#### Long-term Plans

The Department of National Defence anticipates greatly increased military activity and involvement in the North. The types of activity envisaged will cover the full spectrum from military surveillance flights to national building projects such as the Remote Airfield Construction Program. Immediate emphasis is being placed on individual and units training to prepare all elements of the Canadian Forces to live and operate effectively under the diverse extremes of climate and terrain found in the Canadian North. Current planning does not envisage the stationing of operational troops in the North. It is felt that our operational units can most economically and effectively be stationed at southern bases and moved to the North when required for a particular operation.

### Review of 1970 Operations

#### General

Canadian Forces Northern Region was established in May 1970 to co-ordinate Canadian Forces activities in the North. Its headquarters consisting of approximately 60 military and civilian personnel, will be transferred to Yellowknife, N.W.T., in early 1971. Prior to its establishment, two small liaison detachments were established in Whitehorse and Yellowknife to effect liaison and co-ordination between the Canadian Forces and the two Territorial governments.

The Canadian Forces started work in the summer of 1970 on the Remote Airfield Construction Program. Under this program the Canadian Forces have undertaken to improve or build airfields at the following sites for the Department of Indian Affairs and Northern Development: Pangnirtung, Cape Dorset, Whale Cove, Chesterfield Inlet, Igloolik and Pond Inlet. Work commenced in the summer of 1970 on the lengthening and general improvement of the Pangnirtung airfield.

#### Maritime Forces

Four Maritime Command ships, HMCS *Protecteur*, HMCS *Annapolis*, HMCS *Skeena* and HMCS *Ojibwa*, visited the eastern ports of the Northwest Territories during the month of August to assist in the NWT centennial celebrations. In addition to the benefits gained by the local residents and ships' crews participating in these familiarization tours, the *Protecteur* was able to assist the Administrator of the Keewatin District by transporting 20 tons of freight from Churchill to Rankin Inlet. Three regular naval officers, two naval reserve officers and twelve officer cadets received Arctic indoctrination training in Canadian Coast Guard icebreakers during 1970. An average of four Argus (Maritime long-range patrol aircraft) detachments per month spent three to five days each operating from Arctic airfields. These aircraft flew a total of 1,900 hours in the North during 1970, while the smaller Maritime Tracker aircraft flew over 300 hours.

Clearance diving teams from Maritime Command assisted the annual sea resupply of the DEW Line stations in both the eastern and western Arctic. These diving teams, totalling nine men, spent approximately thirty days conducting underwater inspection of ice damage to the MOT vessels. A five-man detachment was established at Frobisher Bay, NWT, in May 1970. This detachment was formed, on a one-year trial basis, to provide operational support, hangerage, accommodation and communications for the Argus detachments on Arctic patrols.

#### Land Forces

Mobile Command initiated an Arctic familiarization program known as Exercise New Viking in April 1970 and during

1970 approximately 700 personnel have received training. This program is based at Churchill, Manitoba with forward bases at Baker Lake, Rankin Inlet, Frobisher Bay, Coral Harbour, Sachs Harbour, Isachen, Eureka, and Mould Bay.

In July/August 1970 approximately 200 Canadian Forces personnel fought forest fires in Wood Buffalo National Park 90 miles west of Fort Smith.

Elements of Mobile Command conducted a number of exercises in the North during 1970 at such locations as Coral Harbour, Eskimo Point, Rankin Inlet and Baker Lake, and also participated in a joint Canada-United States exercise in Alaska.

Three field survey teams operated in the Cambridge Bay area during 1970.

The Canadian Forces Institute of Environmental Medicine, in conjunction with the Arctic Institute of North America, is conducting high altitude acclimatization experiments. Ten volunteers from the Canadian Armed Forces are taking part in these experiments.

### Air Forces

The Canadian Forces conducted 30 search and rescue operations in the North involving 1,273.3 flying hours during 1970. In addition to these real incidents, search aircraft conducted an additional 23 familiarization and training flights totalling 419 hours.

A total of 5,782 flying hours were expended by Air Transport Command in the North in support of: CFS Alert resupply (942); scheduled flights to Alert, Inuvik, Yellowknife and Whitehorse (1,094); training flights, exercises, and operations (1,901); and miscellaneous flights, including a Royal Tour flight of 383 hours (1845).

In accordance with Canadian NORAD agreement, five military personnel operate data centres at each of four DEW Line main sites. Visits to these sites are made three times a year by staff officers from Air Defence Command.

### Communications

The communications research activities at Alert and Inuvik during 1970 remained virtually unchanged from former years.

The DND Satellite Communications Project provided press coverage for the 1970 Royal Tour. This experiment proved to be a valuable demonstration of the flexibility and ease of setting up reliable satellite communications links from a wide variety of locations in the Canadian North. A total of 76 hours of satellite time was allocated for the Royal Tour. Broadcasts were made from Frobisher Bay, Resolute, Inuvik and Yellowknife.

In addition to the above demonstration, transportable SHF satellite terminal and portable UHF satellite terminal trials were conducted at Resolute during 1970 and an airborne UHF satellite terminal was tested in a Canadian Forces C-130E Hercules aircraft throughout the Arctic and as far north as Alert.

### Plans for 1971

The headquarters of the Canadian Forces Northern Region will be operating from Yellowknife, N.W.T., by February, 1971. Two Twin Otter aircraft will be stationed at the Yellowknife airport commencing July, 1971, to support this headquarters and assist in search and rescue work as required. The staff of the Northern Region will be conducting extensive surveys throughout the Yukon and Northwest Territories during 1971 to establish military and civilian contingency plans.

Maritime Command will be operating three destroyers and one supply ship in the North during the 1971 navigation season. Maritime Argus and Tracker aircraft will continue on their present schedules with a total of 2,160 flying hours forecast for 1971. Clearance diving assistance will again be provided during the DEW Line resupply and in addition diving support will be provided to Defence Research Board on a project in the high Arctic.

Canadian Forces search and rescue aircraft have scheduled 41 familiarization flights with an estimated 900 flying hours during 1971.

No change is expected in either communications research activities at Alert and Inuvik or the participation in the joint Canada-United States DEW Line.

Air Transport Command have scheduled a total of 2480 flying hours for 1971, including three exercises (1,000 hours) and scheduled flights to Alert, Inuvik, Yellowknife, and Whitehorse (1,290 hours).

Canadian Forces Northern Region will fly an estimated 1,100 hours in support of its assigned mission on communication and SAR tasks.

The Exercise New Viking program will continue and approximately 1,400 personnel will be indoctrinated during 1971. Other tactical exercises will be carried out in areas of Whitehorse, Frobisher Bay, Antoine Lake, and Carmacks. Two Air Reserve squadrons will hold summer camps in the North, one at Norman Wells and one at Yellowknife.

Exercise Random Access, the construction of a permanent bridge across the Ogilvie River on the Dempster Highway, will be completed during 1971. The Remote Airfields Construction Project will continue with completion of the Pangnirtung airfield.

A thirteen-man survey party will be operating in the area of Coppermine-Committee Bay during the period May/August 1971, carrying out control surveys for 1:50,000 mapping. Other small survey parties will be working in the Frobisher Bay area.

## DEFENCE RESEARCH BOARD

### Responsibilities

To bring scientific knowledge and experience to the assistance of the Canadian Armed Forces in solving problems of military operations in high latitudes. To sponsor and undertake research and technical projects of particular assistance to the Canadian Armed Forces.

### Long-term Plans

Research projects of two main types will be conducted: basic studies in the laboratory, and applied studies or field investigations. Almost every aspect of science is involved, with emphasis on factors, particularly cold, affecting the behaviour of man and his machines, and the physical sciences affecting communications, movement, and navigation in and under the sea, on land, in the air, and in outer space.

### Review of 1970 Operations

The research work was conducted at the Board's laboratories located across the country; these are functional and multi-disciplinary. The Board also supported research in the North by means of grants and contracts to universities and non-government research organizations and by provision of facilities and goods and services to other government agencies. Close collaboration was maintained with research and development agencies in other countries, especially the United States and Britain.

### Geotechnical and Sea Ice Research in the North Eastern Arctic

At the Defence Research Establishment Ottawa (DREO) the work on Arctic research is mainly in geotechnical areas and includes a study of the general relationships of ice and climatic conditions as reflected by oceanographic and ice thickness measurements in fiords and sounds and firn core measurements through snow and ice of the ice caps in the north-eastern Arctic. Results support the generally held theory that we are in a cooling period that will undoubtedly see a worsening of sea-ice conditions in the area. This work will continue in 1971 at a much diminished level and at the same time a start will be made on a study to relate ice movement and ice drift to the driving forces of water current and wind in the channels of the Arctic archipelago with the object of setting up models that will allow reasonable predictions to be made from simple synoptic measurements. The study will take five years to complete.

### Remote Sensing

In 1970, a start was made in assessing the capabilities of airborne remote sensors for ice surveillance when DREO collaborated with MOT in an experiment with an infrared line scanner (IRLS) at Norwegian Bay. The experiment was a test of the usefulness of this equipment as an indicator of ice thickness and age in summer when there are surface melt pools present. Guided by a radio beacon, the aircraft fitted with IRLS overflew a one-mile flight line over first and multi-year ice which were marked with resolution targets (aluminized mylar strips on sheet plastics), a hot spot (gas lantern) and oil spills. Two sequences of flights corresponding to local noon and local midnight were made and ground truthing in the form of ice thickness measurements by coring, radiation temperatures, temperature and salinity profiles were obtained. Preliminary study of the results indicates that thermal contrast between floes of different ages is not sufficient in late summer for discrimination by IRLS.

Work on IRLS and sideways-looking radar (SLAR) sensors will continue in 1971. The object of the trials that will be made is to familiarize the Canadian Forces with these sensors and to evaluate sensor performance. This work is being done by DREO and the Defence Research Establishment Valcartier (DREV) with the help of the Communications Research Centre and will take place mainly in the eastern Arctic.

### Arctic Acoustics

Defence Research Establishment Pacific (DREP) and the Defence Research Establishment Atlantic (DREA) have continuing programs for measuring fundamental acoustic parameters in northern and ice-covered waters. DREP has been concerned with the under-ice situation and in 1970 conducted an experimental test of the effectiveness of ice-mounted sonobuoys. Twenty specially designed and constructed buoys were frozen in holes drilled in the ice at the western end of Parry Channel. Canadian Forces overflights at regular intervals plotted the position of the buoys and recorded a ten-minute sample of the under-ice noise detected by the buoys. Results show that buoys installed in thick polar ice floes survived longer than those placed in annual ice and that the noise levels corresponded to previous measurements made under Arctic ice. Such a sonobuoy field could survive until mid-July after which rapid drifting of disintegrating ice occurs.

DREA carried out measurements on volume reverberation in the Labrador Sea with CNAV QUEST up to 62°N and propagation and noise measurements in the Labrador Sea, Baffin Bay and Baffin Strait by means of an aircraft from Maritime Proving and Evaluation Unit of Maritime Command deploying specially modified sonobuoys. The sonobuoy measurements indicate that this technique gives valid acoustic data and can allow wide-area coverage. This will be continued in 1971 in the Davis Strait area. Some spot-checking with more sophisticated shipborne sensors is, however, necessary and it is planned to do this in 1971 as well as make other oceanographic and acoustic measurements.

DREP made two exploratory trips, one to the Resolute area and the other to Robeson Channel. Surveys of these areas were made and locations were found where magnetic and acoustic research programs will be conducted in 1971.

### Environmental Physiology

Increased emphasis is being placed on man's response and adaption to the cold environment and his protection from the elements. At the Defence Research Establishment Toronto (DRET) immunological reactivity, metabolic response during adaption and endocrine function, are being studied. The study of the effects of cold exposure on immunological reactivity in the body was prompted by the apparent increase in susceptibility to infections and allergies in a significant number of military personnel. During 1970, work has shown that changes in immunological reactivity do occur. The cellular aspects of these changes are being investigated. The preferential utilization of fat for heat production in cold-exposed animals has been demonstrated, and factors important in controlling the

overall rate of energy production are being investigated. Continued attention is being given also to the decrease in resistance to cold which results from exposure to combined cold and altitude. Effort was also directed towards the development of uniformly responsive and non-responsive strains of rabbits to provide a more homogeneous system for experimentation, the further characterization of the anti-body response during cold exposure and the effects of immune responsiveness in mice. This work will continue in 1971.

### Environmental Protection

The work in environmental protection at DREO in 1970 involved mostly familiarization with currently available clothing and equipment and the environmental situations and conditions of usage. A parametric study to examine the total energy budget of small groups of men working in the Arctic in the context of a number of possible scenarios was started in 1970 and will continue in 1971.

### Operational Research

Two major contributions in operational research support from the Defence Research Analysis Establishment (DRAE) involved a cost effectiveness comparison of different types of aircraft for Arctic surveillance and a detection experiment in the Arctic environment.

In the first study DRAE personnel formed part of a study team together with CFHQ staff. Various options were costed on the basis of lifetime cost, including capital cost, and operating, maintenance and personnel costs within the context of a defined "unit surveillance task". Different aircraft performance characteristics and operational procedures were considered to set the number of aircraft required and to perform the unit task with the required frequency.

The detection experiment carried out in conjunction with New Viking exercises was to obtain data on the detection of small military groups operating in the Arctic in the summer by visual means, using Argus overflights of ground troops at four advanced development bases, Sachs Harbour, Mould Bay, Eureka and Isachsen.

### Other Studies

The Defence Research Establishment Suffield (DRES) considered the types of Arctic research it could support with its unique open-range facilities and is proposing work in support of the problem of human sewage and other pollution and waste disposal in the year 1971.

Work on power sources, particularly the improvement of shelf life, output per unit weight and volume, reliability, and performance of batteries and fuel cells at low temperatures has continued at DREO. More specifically, in studies related to the operations of batteries containing silver-oxide electrodes, it was found that a soluble species forms during the low-temperature anodic oxidation of silver. Electron spin resonance was used to detect the solvated electron and ozonide ion in this work. This type of research to optimize battery performance at low temperatures will continue in 1971.

Other activities by DREV were an investigation of ice penetration using shaped charges and development of coloured-smoke markers. The former study arose out of the requirement both for research purposes and for military operations to place electronic packages in the ocean under thick ice. It was demonstrated that a 25-lb shaped explosive charge can make a clean hole at least 3.5" in diameter through about 11 feet of ice. The latter work resulted in two types of marker being developed for CFHQ for marking sites of military operations in a snow environment.

DREV plans for 1971 include a number of tasks, some of which are presently still being defined. The work includes: further work on smoke markers, work on ice penetration, work to improve infrared surveillance technology; ice penetration; and work on slurry explosives, as these could be extremely valuable for military and civil construction in the North. The advantages lie in their safety, convenience, and low cost.

### Grants and Contracts

A number of extra-mural studies were supported by grants and contracts with universities and other non-governmental agencies.

### GRANTS

- To McGill University for research on the engineering properties of frozen soil.
- To McGill University for a study of deformation of ice at high reduction and strain rates.
- To McGill University for Arctic sea ice mapping from satellite photographs.
- To the Arctic Institute of North America for the Baffin Bay – North Water project.
- To Victoria University for model studies on reverberation from sea ice.
- To York University for work on the reaction of the constituents of the upper atmosphere.
- To Ottawa University for a study of the preservation of permafrost by means of a two-phase thermosyphon.
- To University of New Brunswick for a national inventory of muskeg types.
- To Queen's University for research on the stability of airfield and foundation pads on muskeg.
- To University of Saskatchewan for a Northern Canada transportation study.
- To the University of Saskatchewan for research on particle influx near the auroral zone.

- To the University of Saskatchewan for studies concerning western equine encephalitis virus in Saskatchewan.
- To the Royal Military College for research on evaluation and stabilization of highly compressive terrain for use as V/STOL-aircraft landing sites.
- To the Royal Military College for research on the physics of metals in very low temperatures.
- To the University of Western Ontario for research on the physics of the troposphere as related to UHF radio transmissions.
- To the University of Western Ontario for studies on VHF radio wave scattering in the ionosphere.
- To the University of Western Ontario for support of ionospheric studies using satellites.
- To the University of Toronto for studies of hypothermia and endocrine function, the biochemical mechanisms involved in cold adaption, and the effects of cold on pharmacological reactions.
- To the University of Manitoba for research on effects of adverse environmental conditions on intellectual and perceptual processes.
- To Laval University for a study of circulatory adaption to cold stress.
- To Laval University for measurement of vertical forces exerted by ice in a confined space.
- To McMaster University for chemo-reception studies on bloodsucking flies, particularly Tabanidae.
- To McMaster University for investigation of beach characteristics and nearshore processes in the Canadian Arctic.
- To McMaster University for research on shear strength of soft soils under repeated loads.
- To McMaster University for research on soil characteristics, terrain mapping and terrain analogues in Arctic areas.
- To the University of Alberta for isotopic studies of glaciers and high-altitude precipitation.
- To the University of Guelph for orthophoto development.
- With McGill University for meteorological and geophysical work at Tanquary Fiord.
- With the Arctic Institute of North America to provide limited consultant work.
- With McGill University for a study of terrain evaluation and classification for mobility.
- With McGill University for a study of soil-wheel interaction in that which concerns off-road vehicles.
- With the University of Saskatchewan for studies in radiation effects and their relationship to composition, heating, and circulation in the stratosphere and mesosphere.
- With Queen's University for research on the susceptibility of black flies to DDT, including field residues.

#### Contracts

- With McGill University for research on ice physics, with special reference to the study of sea ice.

## DEPARTMENT OF NATIONAL HEALTH AND WELFARE

### MEDICAL SERVICES BRANCH.

#### Responsibilities

Medical services of the Department of National Health and Welfare through the Northern Health Services has had the responsibility of developing total health care in the North. Under special arrangements with both Territorial governments, the Branch not only acts as the federal health agency but as the executive of the territorial health agency as well. The costs of the health and treatment programs are shared by federal and Territorial governments under various arrangements.

The hospital insurance program in the Northwest Territories is administered by the Territorial Hospital Insurance Board, a Crown corporation established under Territorial ordinance. Hospital care is free to all bona fide residents from birth in the Territories or for persons from elsewhere and legally entitled to remain in Canada from a date three months after establishing residence in the Northwest Territories. In the Yukon, the hospital insurance program is administered and operated by the Government of the Yukon with a departmental hospital insurance board acting in an advisory capacity.

Medical care insurance coverage is expected to be available in the Northwest Territories on April 1, 1971, to all persons entitled to hospital insurance coverage.

Medical care insurance is also expected to be available in the Yukon on April 1, 1971 under a plan supported in part by personal contributions in the form of premiums deducted from salaries.

#### Long-term Plans

##### *Environmental Health*

Provision of adequate and safe piped water and sewage systems is the objective for all permanent communities in the North. New Settlements are planned collectively, involving the agencies responsible for services and well-being.

Health hazards are monitored and their effect on health is assessed.

During the year, the problem of massive arsenic pollution at Yellowknife was kept under control and public food and water

supplies were at all times maintained within acceptable limits of safety.

Mercury levels in whale meat obtained in Hudson Bay were abnormally high and use of whale meat had to be discontinued.

#### *Involvement of Northern Residents*

Plans will be formed to encourage northern residents to undertake training in the medical and para-medical fields to increase the percentage of northern residents employed in health activities, but the number of highly specialized employees and self-employed practitioners is not expected to increase substantially in the next five years because of the small numbers of northerners taking prerequisite training and the reluctance of some who are being trained to return to the North.

#### *Research*

Efforts will be made to co-ordinate medical research activities in the Territories and to maintain records of health research in the Territories and circumpolar areas of other countries.

#### *Future Territorial Departments of Health*

Plans will be undertaken for the development of Territorial departments of health for both the Yukon and the Northwest Territories and for a phased transfer of responsibility of health services to these departments over a period of five years.

### Review of 1970 Operations

Health plans were normally implemented and carried out on schedule for the Yukon and the Northwest Territories during the year despite an unusual turnover of staff.

#### *Facilities*

Work on new nursing stations and improvements to existing facilities were completed at the following locations:

Arctic Bay	Port Burwell	Faro
Broughton Island	Resolute Bay	Dawson City
Clyde River	Gjoa Haven	Fort Resolution

A consultant's report on the Inuvik General Hospital has been under consideration. This report assesses the existing facilities and problems of future expansion for the hospital and recommends renovations such as a new clinic and improved accommodation for nursing staff.

#### *Personnel Problems*

The turnover of nurses is still a problem and recruiting, although somewhat improved since the introduction of new amenities and the challenge of greater treatment responsibility, remains an area of concern. It is hoped that with help and co-operation of universities, schools of nursing and other agencies, greater interest will be created among Canadians. Some groups have already undertaken studies to find solutions to this important personnel problem. The shortage of medical officers is less acute but there is still a shortage of dental officers. Recruiting of dental officers remains slow and is not sufficient to meet present and future needs.

#### *Surveys, Studies and Reports*

A report on the clinical training of nurses has been submitted and approved. A protocol for Tuberculosis Chemoprophylaxis Program in Eskimos has been prepared and its implementation is now under study.

#### *Health Problems*

Accidents and other violence, respiratory diseases and diseases of infancy remain the principal causes of death. Venereal disease is on the increase, following the trend on the North American continent. Multiple factors influence this situation and of importance among these are the socio-economic factors. Alcoholism, a major social illness, plays an important role in the incidence of accidents, violence and venereal disease. Preventive measures lie in many areas which affect quality of life, mode of earning a living, and social security. Usually it is directly proportional to the size of the transient population and the nature of the work force.

#### *Plans for 1971*

Serious consideration will be given during 1971 to the study of infant mortality in the North. This will entail detailed investigation of prematurity in the north by a team of specialists working from special centres.

Greater efforts will be made to improve and accelerate the recruiting system and to meet the future needs for professional staff.

As communications and transport remain significant problems and are of primary importance in the delivery of health services, the Medical Services Branch of National Health and Welfare will continue to encourage the development of improved facilities. Medical services are represented on the sub-committees of the ACND dealing with these matters.

## DEPARTMENT OF NATIONAL REVENUE

### CUSTOMS AND EXCISE

#### Responsibilities

To administer the customs and excise laws and regulations, particularly the customs control of movement of aircraft and vessels.

#### Long-term Plans

To increase customs service in pace with the development of the North.

#### Review of 1970 Operations

The local port of Whitehorse, with its outports and other offices, continued operations under the District Port of Vancouver, British Columbia. Outports of Whitehorse were Carcross, Pleasant Camp, Beaver Creek, Fort Nelson and Dawson (closed as a port March 17, 1970).

Edmonton's sub-office at Yellowknife, N.W.T., provided seasonal clearance service for commercial aircraft, conditional upon 72 hours advance notice of arrival being provided to the main port. Also under Edmonton, enforcement service was provided on a part-time basis at Inuvik by a local resident of the area, employed by customs for this purpose.

The RCMP continued to provide service on behalf of customs at Frobisher Bay, N.W.T., under the jurisdiction of the Port of Goose Bay, Newfoundland.

At 18 other points officials of other government departments acted as customs officers for the purpose of clearing ships and aircraft. These were as follows:

#### Royal Canadian Mounted Police

Baker Lake	Pangnirtung
Cambridge Bay	Pond Inlet
Coppermine	Resolute Bay
Eskimo Point	Sachs Harbour
Lake Harbour	Spence Bay
Old Crow	Tuktoyaktuk

#### Department of National Defence Cape Dyer

#### Ministry of Transport

Alert	Isachsen
Coral Harbour	Mould Bay
Eureka	

#### Plans for 1971

Normal planning to meet responsibilities.

### TAXATION DIVISION

The \$83,879 of expenditure incurred by the Department of National Revenue, Taxation in the Yukon for the 1969-70 fiscal year was for the operation of our district taxation office in Whitehorse. This office was closed in June, 1970, and the functions formerly carried out by the Whitehorse office were transferred to the Edmonton, Alberta, district taxation office.

## DEPARTMENT OF PUBLIC WORKS

### Responsibilities

The Department of Public Works is the main construction arm of the federal government. As such, it is responsible for providing total management of a wide range of construction and maintenance work in the North. Much of this work is done on behalf of other government departments which have northern responsibilities.

The Department of Public Works has continuing responsibility for the development and maintenance of navigable waterways in the North. It is also responsible for the construction and upkeep of the northwest highway system, including the Alaska Highway and the Haines Road. In addition, it provides an engineering service to the Department of Indian Affairs and Northern Development for the location, design and construction of roads under their northern roads program, which includes the Dempster and Mackenzie highways.

In general, then, the Department provides architectural, engineering and construction services, and assistance in planning, site investigation, economic feasibility studies, design, construction and management of buildings, public utilities, highways, harbours and wharves.

The Department of Public Works is vitally interested in the whole realty field, especially as it affects the accommodation program of the federal government. It is responsible for the acquisition and disposal of lands and properties, for the leasing of office and other space when Crown-owned space is not available, and for the upkeep of a great number of federal buildings in the North.

The Department of Public Works is responsible for the construction and maintenance of the federal government Northern Pool Housing.

### Review of 1970 Operations

Since the Department of Public Works is, primarily, a service department, the bulk of the projects in 1970 were, as usual, done at the request of various client departments.

### Schools

Work continued on the construction of the new Department of Indian Affairs and Northern Development academic

and occupational school at Frobisher Bay, Baffin Island. The school will provide the first high school facilities for students on Baffin Island and the Keewatin District of the northern Territories. Approximately 475 students will be accommodated in the 24 classrooms and numerous laboratories. The remote location and severe climatic conditions of Frobisher Bay created special construction problems typical of the far north. The unique feature of this school is that it was constructed with thick urethane walls with an outer skin of glass-reinforced plastic. It is designed to resist the intense cold and up to 100-mile an hour winds on Baffin Island. Engineering tests indicated that the new building material offers a practical way of countering the severe northern conditions.

On the other side of Baffin Island, the \$921,000 Cape Dorset school was completed. It has four standard classrooms, a gymnasium and a library.

### Health Facilities

The Department of National Health and Welfare is another important client department. On behalf of that department, the Department of Public Works erected two trailer-type nursing stations on Baffin Island, one at Broughton Island and one at Clyde River. Each unit consists of seven interconnected trailers which contain a large waiting room, examination and treatment rooms, pharmacy and dark room, plus public-health and administration offices. Three bed-sitting rooms, a living room, laundry facilities, washrooms and storage areas are provided for the staff of the nursing stations.

In the Northwest Territories, nursing stations were constructed at Coral Harbour, Fort McPherson, Fort Providence, Fort Harrison, Clyde River, and Fort Resolution, while the station at Baker Lake was expanded, at a total cost of approximately \$1.3 million.

### Accommodation

The Department continued its program of upgrading the buildings which house the many federal government departments requiring space in the North. All necessary new space was found either in leased or Crown-owned buildings.

The Department also continued to provide housing under the federal government Northern Pool Housing Program. A

new 16-unit apartment building was constructed at Inuvik, and eight three-bedroom and two four-bedroom houses were constructed at Hay River.

On behalf of the Royal Canadian Mounted Police, the Department of Public Works during 1970 undertook a large number of small projects, such as constructing living quarters, cell blocks, warehouse and workshops, and modifying sewage systems.

At Fort Simpson, Northwest Territories, Public Works constructed a taxiway and parking apron and an airport access road for the Ministry of Transport.

### Highways

The Department of Indian Affairs and Northern Development program for reconstructing and expanding the road system in the North continued. A contract, which will continue into 1971, was awarded for gravel surfacing and stockpiling of material on miles 117.3 to 231.7 of the Mackenzie Highway. Three-quarters of an inch of crushed surfacing material is being placed on the highway, and gravel is being stockpiled for future maintenance along a portion of the road between Fort Providence and Fort Simpson in the Northwest Territories. Under another contract, thirty miles of right-of-way were cleared for the Inuvik Airport Road south along the route. Other contracts were awarded for field surveys, design and preparation of plans and specifications for extensions to the Mackenzie Highway.

Work commenced on the Fort Simpson-Fort Liard Highway in the Northwest Territories. On the Fort Smith Highway in the Northwest Territories, 128 miles were surfaced with crushed gravel. Sub-grade work on Miles 14 to 56 of the Fort Resolution Road continued.

The Department of Public Works is responsible for the maintenance and improvement of the Canadian portion of the Alaska Highway, which winds its way for 1,222 miles from Dawson Creek in British Columbia to the Yukon-Alaska border. The Department's own forces continued to do routine maintenance on the Alaska Highway and the Haines Road within the Yukon Territory. This work force was supplemented by the award of two contracts for gravel crushing and surfacing on 120 miles of the Alaska Highway.

In British Columbia, Miles 300 to 496 of the Alaska Highway will be maintained under a three-year contract awarded in 1970 and valued at approximately \$2.4 million. This contract includes maintenance of access roads to microwave sites and airstrips.

On a 24-mile section of the Alaska Highway at Whitehorse in the Yukon Territory (miles 904.2 to 928.5) paving was almost completed. The contract was valued at approximately \$1.2 million. This is the first section of the highway in the Yukon Territory to be paved.

The program to keep dust under control on the highway at built-up areas continued in 1970, as did pre-engineering studies on roads and bridges.

Progress was made in the bridge replacement program on the Northwest highway system. On the Haines Road, Yukon

Territory, three new permanent bridges were constructed at Blanchard River, Takhanne River and Kathleen River. The Blanchard River structure is 170 feet long, and the Takhanne Bridge 153 feet. On the Alaska Highway, the Koidern River No. 2 Bridge and the Spencer and Young's Creek culverts were completed.

### Marine

The Department of Public Works is responsible for the development and maintenance of navigable waterways in the North. The rapids at Sans Sault on the Mackenzie River, 70 miles downstream from Norman Wells, presented a hazard to shipping. In 1970, work started on a program to improve the navigation channel on the river. Contracts were awarded for drilling and blasting and dredging rock and loose material out of two areas in the Sans Sault Rapids. The area will be dredged to make a clear channel for navigation and increased to a minimum width of 350 feet to meet the requirements of the larger boats and barges using the river. Approximately 275,000 cubic yards of material will be removed from the bed of the channel to provide a minimum depth of eight feet below low-water level. The improvement of the channel is an important contribution to transportation in the North because of the high cost of air transport and winter tractor train.

At Herschel Island in the Beaufort Sea, Canadian western Arctic, a study is being made to investigate the economic and technical feasibility of constructing a marine terminal on the Arctic coast. The study, undertaken at the request of the Department of Indian Affairs and Northern Development, centers on Herschel Island because of its strategic location on the western shore of Mackenzie Bay, into which the Mackenzie River empties. Prudhoe Bay, Alaska, site of important oil finds, is 250 miles to the west, and Atkinson Point on the Tuktoyaktuk Peninsula, where a large oil company has reported the discovery of oil, is 200 miles due east of Herschel. Herschel Island has a protected moorage of fairly deep water close to land and is the only such natural area west of the Mackenzie delta. At most locations along the Arctic coast a shallow shelf runs far out into the sea and the coast is subject to severe winds and ice conditions.

Wharves at Yellowknife and Fort Providence were repaired, and a new temporary wharf was installed at Fort McPherson. At Gold Lake, the deck of the existing wharf was replaced.

### Northwest Territories Government

The Department of Public Works also undertook work on behalf of the Government of the Northwest Territories during 1970. Recreation and camp areas were constructed at Fort Smith, Hay River, Fort Simpson and Yellowknife, and feasibility studies were carried out at various other locations.

### Plans for 1971

To combat the problems caused by unpredictable prices in the construction market on long-term projects, the Department has gone to a project management system. This team approach will give greater flexibility on large projects. The

Department will work closely with private enterprise and place heavy reliance on the construction industry in the course of building programs.

In 1971, the Department will continue to offer improved management, engineering, design and construction services to client departments for the construction of buildings, roads, marine and other engineering projects.

Research into special construction techniques and materials suitable for use in the North will continue in 1971 so that in future, even better facilities and accommodation can be supplied to client departments.

### **Schools**

The academic and vocational school at Frobisher Bay is due for completion in September, 1971.

### **Health Facilities**

On behalf of the Department of National Health and Welfare, Public Works will undertake major addition and renovation programs in the hospitals at Inuvik and Frobisher Bay, and will commence construction of a new hospital at Fort Simpson. In addition, the nursing stations at Spence Bay and Tuktoyaktuk will be expanded.

### **Accommodation**

The Department will continue constructing, maintaining, upgrading and administering the federal government Northern Pool Housing. New housing will be built at Hay River, Fort Simpson and Inuvik.

At Yellowknife, a hangar will be constructed in a cost-sharing program of the Royal Canadian Mounted Police and the Department of National Defence.

### **Highways**

The maintenance program on the Alaska Highway will continue at the same level as in previous years.

The early completion of the Dempster Highway has a high priority in the Department's workload for 1971. The Dempster Highway runs from Dawson City in the Yukon Territory to the Mackenzie Highway in the Northwest Territories. Construction of miles 123 to 166 will be completed. The location and design of the Highway from Mile 166 to the Yukon/Northwest Territories border will be decided upon. This work is being done on behalf of the Department of Indian Affairs and Northern Development.

On the Dempster Highway, a contract will be awarded and work begun on clearing, grading and gravel-surfacing of miles 330 to 365. Departmental personnel will supervise the construction of the 360-foot Ogilvie River bridge at Mile 123. This bridge is being constructed by the Department of National Defence as a training exercise.

Plans and specifications will be prepared for miles 51 to 86 of the Mackenzie Highway, and construction will commence on miles 931 to 964.

Tenders will be called for the construction of the Carcross-Skagway Road from Mile 48.0 to 50.3.

### **Marine**

Drilling, blasting and dredging will continue at Sans Sault Rapids in order to further improve the navigation channel. In addition, an extensive marine study of the whole Mackenzie River will be undertaken. The feasibility study for a marine oil terminal at Herschel Island will be pursued.

In order to provide facilities for transportation of goods at Great Whale River, an isolated community in northern Quebec, the Department of Public Works will construct a new floating wharf in 1971.

## DOMINION BUREAU OF STATISTICS

### AGRICULTURE DIVISION

#### Responsibilities

To collect and publish data on the number of wildlife pelts taken.

#### Long-term Plans

No change is contemplated in the future.

#### Review of 1970 Operations

*Fur Production* — Data were obtained on the number and value of pelts taken in both regions for the 1969-70 fur season. The number of pelts exported from the Northwest Territories and the prices paid to trappers were provided by the government of the Northwest Territories at Yellowknife. The number of pelts exported from the Yukon Territory and the prices paid to trappers were provided by the Yukon Territorial Game Branch, government of the Yukon Territory, Whitehorse.

#### Plans for 1971

Same as 1970.

### CENSUS DIVISION

#### Responsibilities

To conduct a census of population and agriculture in the north as required by the Statistics Act.

#### Long-term Plans

In previous censuses, the responsibility of census-taking in the north was delegated to the RCMP. In the future, as population concentrations and density permit, the division plans to use the census commissioners and census representatives as in the rest of Canada. The Yukon is already under this regular census organization.

#### Review of 1970 Operations

In 1970, representatives of the Census Division visited officials of the government of the Northwest Territories to review enumeration procedures for the 1971 Census and to identify potential enumeration problems. The trip permitted the Census Division to finalize enumeration procedures and to develop solutions to problems peculiar to the North. It was decided, with recognition of the constraints of access and size, that civilian census representatives will be used to enumerate population centres of 50 or more persons. The RCMP have consented to enumerate the balance of the northern population located in remote areas.

#### Plans for 1971

In the June 1971 Census, the major portion of the North will be enumerated through the basic census organization while the RCMP will enumerate the balance. Respecting the problems of access and population density, canvasser (face-to-face interview) procedures will be used. It should be stressed, however, that the kinds of data collected, the questionnaires and the quality standards imposed will be identical to those in the rest of Canada.

### EDUCATION DIVISION

#### Responsibilities

To collect, compile and analyze statistics on students at the elementary and secondary levels of education, and trade and apprenticeship training. Data is collected on age, grade, sex, enrolment, operation and attendance, and pupil withdrawals.

#### Long-term Plans

No long-term plans except for the continuation of the existing program.

#### Review of 1970 Operations

During 1970, the data collection and analysis program continued. As well, a publication, *North of the 60th Parallel*, covering the 10 years, 1960-61 to 1969-70 was issued.

## HEALTH AND WELFARE DIVISION

### *Notifiable Diseases*

#### Responsibilities

To collect, each week, reports of new cases of notifiable diseases (certain epidemic and infectious diseases as recommended by the Dominion Council of Health) for the Yukon and Northwest Territories.

#### Long-term Plans

No significant changes are planned.

### Review of 1970 Operations

A weekly summary report on notifiable diseases (*Notifiable Diseases*, Reg. -9007-501) is prepared for distribution to provincial departments of health, to the National Health and Welfare department and to other agencies. Statistical information related to notifiable diseases is also published annually in the *Annual Report of Notifiable Diseases*, catalogue number 82-201. Both the weekly and annual reports include information relating to the Yukon and Northwest Territories. The time required to process this information for the North in 1970 was less than one clerk-week.

#### Plans for 1971

Activities in this area in 1971 are expected to be the same as in 1970.

### *Tuberculosis*

#### Responsibilities

To collect information on notifications of new active and reactivated cases, on tuberculosis outpatient drug treatment, and on tuberculosis institutional data.

#### Long-term Plans

No significant changes are planned.

### Review of 1970 Operations

In 1970, the notifications of new active and reactivated cases were collected, as were the outpatient treatment particulars. The institutional data (admission-separation) were also collected for the Northwest Territories. (There are no tuberculosis hospitals in the Yukon.) This information was published in a report entitled *Tuberculosis Statistics, Volume 1 - Tuberculosis Morbidity and Mortality*, catalogue number 83-206. To do the work in 1970 took about two clerk-weeks.

#### Plans for 1971

Activities in 1971 are expected to be as in 1970.

### *Hospital Morbidity*

#### Responsibilities

To collect information on the admission-separation forms for general and allied special hospital cases of residents in the Yukon and Northwest Territories.

#### Long-term Plans

When historical work is completed, annual tables will be prepared.

### Review of 1970 Operations

The preparation of historical work was undertaken for the period 1962 to 1968.

#### Plans for 1971

A special historical report is now being prepared covering hospitalized cases during the years 1962 to 1968 inclusive in the Yukon and Northwest Territories. The information will be in terms of the three-digit classification of the International Classification of Diseases and will further distinguish the hospitalized cases by three origins - Indian, Eskimo and other.

Approximately a month of clerical time and some computer resources will be involved in concluding this operation.

### *Vital Statistics*

#### Responsibilities

Under long-standing arrangements, the vital statistics offices of the two Territories supply DBS with copies of birth, marriage, stillbirth and death records filed in their jurisdictions under their vital statistics ordinances. Data from these records are used in compiling the official national vital statistics. In turn, DBS supplies the Territorial office with detailed annual tabulations relating to their areas, for local and administrative purposes. In addition to total counts of such events occurring in each local area, these tabulations provide detailed information on marriage, fertility and mortality rates for the total population and the principal ethnic groups, which is used in long-term planning of health, social welfare and other services.

#### Long-term Plans

Forms used for the reporting of births, marriages and deaths will be revised to conform to prototypes recommended by the Vital Statistics Council for Canada. Ordinances will likely also be revised to conform with model legislation recommended by the council. Computerization of tabulation procedures in DBS will result in acceleration of tabulations supplied to the Territorial administrations.

### Review of 1970 Operations

Detailed tabulations of births (cross-tabulating ages and other characteristics of the parents and of the event), marriages (by religion, status, etc.) and deaths (by cause, age, sex, and other characteristics) were provided to the northern administrations covering the events occurring in 1969. Arrangements were made, for the first time (in 1968), to classify all events by newly-organized health districts.

## Plans for 1971

No changes are contemplated for 1971.

### *Health Manpower*

#### **Responsibilities**

To collect wage and salary data from employees of health manpower occupational groups as well as to collect socio-economic data on such groups in the Yukon and Northwest Territories using provincial/national registration forms.

#### **Long-term Plans**

Tentative plans call for a series of all health manpower occupations collecting significant socio-economic characteristics. Among the occupational groups are: physicians, medical laboratory technologists, radiological technicians, and occupational physiotherapists.

### **Review of 1970 Operations**

Wage and salary data for nurses in hospitals and public health nurses were collected in 1970. The former is yet to be published, the latter was published in 1970.

Characteristics of registered nurses employed in the Yukon and Northwest Territories were also collected in 1970 and are to be published in the second quarter of 1971. In addition, an historical series of 12 health manpower reports was undertaken, occupational data were collected on HS-1 and presented in each report for the period 1961-68. To date, eight of the reports have been published.

## Plans for 1971

Systems are being developed for the occupational groups previously noted in order to collect, process and publish data in 1971.

### *Hospitals*

#### **Responsibilities**

To collect data on the facilities, services, staffing and finances of Canadian hospitals, and mental and tuberculosis institutions, including those located in the Yukon and Northwest Territories, where applicable.

#### **Long-term Plans**

To assist in the processing of data, plans are under way to develop a new reporting form for mental institutions to incorporate these institutions into one system along with tuberculosis and other hospitals (general and allied special), which have been computerized since data-year 1961. Plans also call for the collection of financial data from private and federal hospitals to accompany those already collected from the public sector. Information somewhat similar to that collected from hospitals will, in the future, be obtained from nursing homes and welfare institutions.

## **Review of 1970 Operations**

As of December 31, 1970, there were 42 general and allied special hospitals operating in the Yukon and Northwest Territories. The following is a classification by type, with the rated bed capacity:

Public — 7 hospitals with 237 beds

Private — 1 hospital with 13 beds

Federal — 28 hospitals with 230 beds

Annual hospital returns were sent to each of these through the Yukon Territorial Hospital Insurance Services in Whitehorse and the Department of Indian Affairs and Northern Development in Ottawa. Annual data (for the year 1968) were published in a series of 12 annual reports (catalogue numbers 83-201, 83-205, 83-207 and 83-210 to 83-218). Quarterly hospital returns were also sent directly to these hospitals and three publications covering the first three quarters of 1970 were published (catalogue number 83-001). During 1970 the Canadian Schedule of Unit Values for Clinical Laboratory Procedures was substantially revised and computerized. A new Canadian Schedule of Unit Values for Physiotherapy and Occupational Therapy was developed to assist hospitals in reporting uniform data. Application of computerized photocopy techniques was completed for use in the 1969 Annual Hospital Statistics Program to be published in 1971. This procedure is expected to significantly reduce clerical workload and improve timeliness.

## Plans for 1971

Plans include continuation of the existing programs as described, plus development of a Canadian Schedule of Unit Values for Radiology Procedures to assist hospitals in reporting uniform data. Also, preliminary work will begin on the long-term plans described under that section. Special programs to produce data for selected groups of hospitals such as children's, teaching, etc. will be developed.

## **JUDICIAL DIVISION**

#### **Responsibilities**

The Judicial Division has responsibilities for statistics on law enforcement, the administration of justice and corrections, and the sequential integration of these data to give a full statistical description of the process of dealing with offences, accused persons and offenders. The objective of the Division is to show the effectiveness of the law enforcement and judicial and rehabilitative processes, and permit the various agencies of the criminal justice system to evaluate their efficiency.

**Long-term Plans**

No long-term plans, except changes which the new integrated criminal statistics information systems may bring about in the present criminal statistics method.

**Review of 1970 Operations**

The following is a list of Judicial Division publications with data pertaining to the Yukon and Northwest Territories.

*Statistics of Criminal and Other Offences* (catalogue number 85-201)

Data for the Yukon and Northwest Territories on:

- persons charged with indictable offences, by sex; persons convicted, by specified age groups and sex
- persons convicted under the Narcotic Control Act, by type of offence, country of birth
- convictions of offences punishable on summary conviction

Respondents:

- three local court clerks

*Juvenile Delinquents* (catalogue number 85-202)

Data for the Yukon and Northwest Territories on:

- appearances before the courts and results
- residence
- characteristics

Respondent:

- one local court clerk

*Police Administration Statistics* (catalogue number 85-204)

Data on police strength, personnel and transport for the Yukon and Northwest Territories classified by police force and by ratio of the number of policemen to the number of automobiles.

Respondents:

- RCMP Air Detachment

*Crime Statistics (Police)* (catalogue number 85-205)*Traffic Enforcement Statistics* (catalogue number 85-206)

Information for Yukon and Northwest Territories is distributed by type of force. Offences under the Criminal Code, federal and Territorial regulations are broken down by offence reported, unfounded, actual number, cleared otherwise, and persons charged. Rates per 100,000 population aged seven years and over and percentages are shown.

Motor vehicles stolen, persons missing, located and drowned are included in *Crime Statistics*. Traffic accidents, persons killed, injured and property damage are given in *Traffic Enforcement Statistics*.

*Correctional Institution Statistics* (catalogue number 85-207)

- percentage of number of persons in custody to standard capacity for Yukon and Northwest Territories
- population movement in and out for RCMP Guardrooms, Whitehorse  
Correctional Institution, Yukon Mobile Institution, Yellowknife  
Correctional Camp and Fort Smith Training Centre
- place of sentence of territorial offenders by penitentiary.

Respondents:

- twelve local officers

*National Parole Board Statistics\**

Information for Yukon and Northwest Territories compiled on:

- decisions made by National Parole Board
- persons released on parole
- persons terminating parole
- persons denied parole

*Murder Statistics* (catalogue number 85-209)

- murder incidents and victims in the Territories.

**Plans for 1971**

The Canadian Criminology and Correction Association has undertaken a correctional study of the Northwest Territories sponsored by the Department of the Solicitor General. The following indicators are provided by the Judicial Division for the years 1967, 1968, 1969 and 1970 to June 30th.

*Juveniles*

- Number of cases brought to attention of police, by place of RCMP Detachment and type of delinquency.
- Number of cases seized by the juvenile court, by disposition of cases resulting in probation, committals to Fort Smith Training Centre and parental or other care.
- Number of cases brought before all Northwest Territories juvenile courts for delinquency hearing, by age, place of origin, racial origin, type of delinquency resulting in probation, fine, committals to Fort Smith Juvenile Training Centre and parental or other care.

*Adults*

- Number of offences known to police under the Criminal Code, other federal statutes and territorial ordinances.
- Number of offences known to police cleared by charge or otherwise and not cleared.
- Number of cases brought before all Northwest Territories courts distributed by age, racial origin, place of origin, type of offence. Disposition of above cases: acquittals, dismissals, convictions by fine, probation, suspended sentence and committals to penal institutions; reduced charges resulting in acquittals and convictions and dispositions of the latter by fine, probation, suspended sentence, committals to penal institutions.
- Number of adult and juvenile persons charged distributed by sex, place of RCMP detachment and type of offence.

\*This is a National Parole Board publication but the information was processed in the Judicial Division.

## MANUFACTURING AND PRIMARY INDUSTRIES DIVISION

### Responsibilities

To collect, compile, analyze and publish, within the provisions of the Statistics Act, statistics on manufacturing, mining, logging, fishing and energy for the Northwest Territories and the Yukon Territory.

### Long-term Plans

To continue and, where applicable, to intensify the current statistical program, including a program of endeavouring to make it possible to publish more data now held confidential under provisions of the Statistics Act.

### Review of 1970 Operations

The Division continued its collection and publication of data on mining, energy, manufacturing, fishing and forestry for the Territories.

Industries, which the Division surveys, accounted (in preliminary 1968 "Survey of Production" data issued by the Bureau's National Output and Productivity Division) for 99 per cent of the value of production of the Territories' goods-producing industries, excluding construction for which data are not published.

In mining, by far the largest industrial sector, measured by output, regular annual statistics continued to be issued for both the Northwest Territories and for the Yukon Territory. In data of the crude petroleum and natural gas industry, the "break-out", introduced in 1969, separating a combination entitled "Yukon, Northwest Territories and Arctic Islands" from "off-shore and Hudson Bay" was continued as was the release of data separating "Hudson Bay" from "east coast off-shore" and "west coast off-shore". (These are all areas under federal jurisdiction, but the latter two are not in the North.) Monthly and annual data were again published on pipelines for the Yukon Territory.

The monthly electric power statistics, first published for each Territory in 1968, have been continued, in addition to the annual data also issued for each Territory.

In manufacturing, the annual Census of Manufactures has continued to yield publishable totals for both the Northwest Territories and the Yukon Territory, as a result of the Division's policy of seeking respondent authorizations to release certain statistics which would otherwise be confidential.

Annual data on each Territory are being published for fishing, while figures are issued monthly on this industry for the Northwest Territories.

In forestry, data were published for the Territories on a combined basis.

### Plans for 1971

To continue the present expanded program of publication.

## TRANSPORTATION AND PUBLIC UTILITIES DIVISION

### Responsibilities

To develop and publish statistical series covering all aspects of rail, water, motor vehicle, and air transport, as well as communications systems and other utilities for the Yukon Territory and the Northwest Territories.

### Long-term Plans

There are no significant long-term changes planned in this area.

### Review of 1970 Operations

#### Road Transport

The principal statistics covering aspects of the North are contained in the following publications:

*Road and Street Mileage and Expenditure*, catalogue number 53-201

*Motor Vehicle Traffic Accidents*, catalogue number 53-206

*The Motor Vehicle, Part II: Motive Fuel Sales*, catalogue number 53-218

*The Motor Vehicle, Part III: Registrations*, catalogue number 53-219

*The Motor Vehicle, Part IV: Revenues*, catalogue number 53-220

*Moving and Storage Household Goods*, catalogue number 53-221

*Motor Carriers – Freight, Part I*, catalogue number 53-222

*Motor Carriers – Freight, Part II*, catalogue number 53-223

In the report, *Road and Street Mileage and Expenditure*, the figures for the Northwest Territories and the Yukon Territory are shown separately. In the reports, *Motor Vehicle Traffic Accidents*, and *The Motor Vehicle*, Parts II, III, and IV, the figures for the Northwest Territories and the Yukon Territory are combined. And finally, in the reports, *Moving and Storage Household Goods* and *Motor Carriers – Freight*, Parts I and II, figures for the Yukon Territory are combined with figures for British Columbia.

Sources for statistics on Road Transport are:

- Territorial Treasurer, Whitehorse, Yukon Territory
- Director, Northern Administration Branch, Department of Indian Affairs and Northern Development
- Registrar of Motor Vehicles, Department of Indian Affairs and Northern Development, Whitehorse, Yukon Territory
- Commissioner of the Northwest Territories, Yellowknife, Northwest Territories.

#### Rail Transport

Statistics covering aspects of the north are contained in the publications, *Railway Transport*, Part I to VI, catalogue numbers 52-207 to 52-212.

Railways operating in the Yukon Territory and the Northwest Territories are the White Pass Yukon Route Railway and the New Great Slave Lake Railway. Prior to 1968, the statistics for the White Pass and Yukon Railway were shown

separately in *Railway Transport*, Part II, III, IV and V. This was discontinued commencing with 1968 statistics, but the data are available from source documents at DBS. Separate details on the freight traffic of the Great Slave Lake Railway are available beginning with 1970 data.

Sources of data are:

- White Pass Yukon Route Railway
- New Great Slave Lake Railway.

#### *Water Transport*

Principal statistics covering the water transport aspects of the North are contained in the following publications:

*Shipping Report, Part III: Coastwise Shipping*, catalogue number 54-204

*Water Transportation*, catalogue number 54-205

*Shipping Report, Part IV: Origin and Destination for Selected Ports*, catalogue number 54-206

*Shipping Report, Part V: Origin and Destination for Selected Commodities*, catalogue number 54-207.

These reports have complete statistics for Churchill, Manitoba, plus all Northwest Territories, Northern Ontario and Northern Quebec ports that trade with Eastern Canada. Data lacking at this time include Northwest Territories statistics via the Mackenzie River plus the occasional movements between places in the North transported in small vessels whose size is less than the required reporting criteria. However, the published statistics do not include operations of government vessels.

In 1970, there were four companies in the Northwest Territories which submitted data for the above-mentioned report. These companies were: Northern Transportation Co. Ltd., Kaps Transport Ltd., Cooper Barging Ltd. and Lindberg Transport Ltd.

#### *Air Transport*

Principal statistics covering the air transport aspect of the North are given in the following reports:

*Aircraft Movement Statistics*

*Air Passenger Origin and Destination, Domestic Report*, catalogue number 51-204.

The report, *Aircraft Movement Statistics*, is prepared for the Ministry of Transport and provides statistics for individual airports, including 20 in the Northwest Territories and the Yukon Territory.

The other report, *Air Passenger Origin and Destination*, provides data on domestic air passenger traffic showing specific origin and destination points in the North. Data are collected through the co-operation of Canadian air carriers. Scheduled carriers participating in the survey are Air Canada, CP Air, Eastern Provincial Airways, Pacific Western Airlines, Quebecair and Transair. The non-scheduled carriers participating are Nordair and Norcanair. This report is prepared for the Air Transport Committee, Canadian Transport Commission.

#### *Public Utilities*

Statistics covering the public utilities aspects of the North are given in the following reports:

*Telegraph and Cable Statistics*, catalogue number 56-201

*Telephone Statistics*, catalogue number 56-203.

In some of the tables, the figures for the two Territories are combined; in others, they are shown separately. In some tables, figures are included with British Columbia. Sources of statistics for telegraph, cable and telephone statistics are:

- Ministry of Transport
- Canadian National Telecommunications
- Bell Canada

#### *Plans for 1971*

In the truck origin and destination survey, presently under development, the Division intends to collect commodity, origin and destination data to and from the Territories. No further changes in the other surveys are contemplated for 1971.

## ELDORADO NUCLEAR LIMITED

### Responsibilities

To operate a uranium mine in the Beaverlodge area of northern Saskatchewan and to engage in such exploration activity as the company may see fit.

### Long-term Plans

To continue the above with due regard to available uranium markets.

### Review of 1970

Under the operating policy adopted in 1969, the production of uranium in 1970 was maintained at approximately 75% of capability. The number of employees at the end of the year stood at 442, of whom 314 resided in Uranium City.

### Plans for 1971

In keeping with the company's objective of maintaining ore reserves, a major underground development will commence during 1971 as sinking begins on a new internal shaft, or winze, to carry the mine to the 34th level and to a vertical depth of 5,451 feet. Production will continue at a level comparable to that in 1969.

## GOVERNMENT OF THE NORTHWEST TERRITORIES

### Responsibilities

To exercise government jurisdiction within the Northwest Territories, exclusive of control over natural resources (except game which is a Territorial resource.)

### Long-term Plans

To develop the Northwest Territories through legislation and administration geared to the special social and economic needs of the Northwest Territories, and to involve all northern residents in the processes of governmental, economic and social development.

### Review of 1970 Operations

The year 1970 will long be remembered by people across the Northwest Territories as an historic year in which unprecedented attention was focused on Canada's North and northerners worked together in unity to achieve a successful Centennial.

Centennial Year was highlighted by the visit of the Royal Family to the N.W.T., the Arctic Winter Games held in Yellowknife, the Sir Alexander Mackenzie Canoe Race down the Mackenzie River from Fort Providence to Inuvik, and hundreds of community projects across the N.W.T.

There was notable progress in political development during 1970 and increase in the responsibility of both the Territorial government and the council of the Northwest Territories. On April 1, 1971, administrative responsibility for the Eastern Arctic was transferred from the Department of Indian Affairs and Northern Development to the Territorial government, thus completing a transfer of powers which now enables the Territorial government to exercise its jurisdiction across the entire Northwest Territories.

Of equal significance were changes to the Northwest Territories Act passed by the Parliament of Canada in June, 1970, which increased the number of elected members on the Territorial council from 7 to 10, and reduced the number of appointed members from 5 to 4. Council was permitted to set the age in Territorial elections, which they established as 19 years, and to set council indemnities and allowance for its members. The term of office was also increased from 3 years to 4 years.

Development of government at the local level also made significant strides in 1970. Tuktoyaktuk became the first hamlet north of the Arctic Circle and Inuvik the first town in the Arctic, while Yellowknife became the Northwest Territories' first city.

### Review of Council Operations 1970

Three sessions of council were convened during the year under review. The forty-first session, held in Yellowknife from January 12 to January 30, dealt mainly with a record budget of \$74,500,000 for the 1970-71 fiscal year. An increase of approximately 35 million dollars from the previous year was required, principally for the administration of the Eastern Arctic.

Among the most important features of an amendment to the Game Ordinance enacted by council, were provisions to allow sport hunting of buffalo by non-residents and in certain specified areas limited sports hunting of polar bears by residents and non-residents.

The borrowing powers of municipalities were expanded when council amended the municipal ordinance to authorize the exclusion of self-liquidating debts from the calculation of a municipality's limit of borrowing. A Pine Point Housing Loan Agreement Ordinance was passed to finance the construction of housing for those employees of Pine Point Mines Limited for whom the company does not supply housing.

The forty-second session of council was held in Yellowknife from June 8 to June 18. At this session council passed 19 bills and accepted one recommendation to council and two sessional papers.

Among the major legislation was an Ordinance to Provide for the Purchase, Sale and Consumption of Liquor in the N.W.T. This bill, which was passed by the council with certain amendments, embodies recommendations of the N.W.T. Liquor Board of Enquiry which presented its report in 1969. One of more significant changes introduced by this legislation was the lowering of the drinking age from 21 to 19. The legislation also established a Liquor Control Board. An ordinance for the protection of consumers was passed, which

requires the disclosure of the cost of borrowing in the retail sale of goods and services. Council also passed a Pesticides Ordinance for the control of the use and disposal of substances that are harmful to ecological systems and to human health.

The Labour Standards Ordinance was amended to increase from \$1.25 to \$1.50 the minimum hourly wage rate in the Northwest Territories and the Workmens' Compensation Ordinance was also amended to bring amounts payable into line with present-day costs of living.

To provide for the more efficient protection and control of objects and sights of archaeological and historical significance in the Territories, council passed the Historical Resources Ordinance.

The forty-third session of council opened in Yellowknife on 1 and was prorogued on July 24.

An Ordinance Respecting the Council of the Northwest Territories was passed, which lowered the minimum age of electors in Territorial elections to 19 and fixed the allowances and indemnities of members.

An Ordinance to Provide Medical Care for Residents of the Northwest Territories was passed authorizing a Medicare scheme to provide free medically necessary services to residents of the N.W.T.

A group of ordinances in the judicial area were passed enabling the commissioner to appoint justice of the peace, setting out the jurisdiction and powers of the Territorial court, and enabling the commissioner to appoint magistrates and other court officials. These ordinances were consequent upon the recent amendments to the N.W.T. Act passed by the Parliament of Canada.

## THE PUBLIC SERVICE

The government of the Northwest Territories functions with four program departments – Education, Industry and Development, Local Government and Social Development – and six service departments – Public Works, Treasury, Territorial Secretary, Legal Affairs, Information, and Personnel. There are also special units for Management Services, Clerk of the Council, Territorial Liquor System, the Fire Marshal's Office, Health Insurance Services, and Special Projects. The headquarters administration is located in Yellowknife and there are regional offices at Fort Smith, Inuvik, Frobisher Bay and Churchill for the Keewatin.

## DEPARTMENT OF LOCAL GOVERNMENT

### Responsibilities

Fostering, encouraging and assisting in the development of local government; administration of the municipal and hamlet ordinance; housing programs; town planning and lands; recreation; civil emergency planning.

## Review of 1970 Operations

### Development Division

Tuktoyaktuk became the first incorporated hamlet in a predominantly Eskimo settlement and the communities of Rae and Frobisher Bay both petitioned to be incorporated as hamlets by April 1, 1971. Regional development officers were located in the regional offices and civic affairs courses were held in various communities throughout the North. Settlement services were, provided in the areas of water and sanitation services, emergency airstrips, sidewalks, streetlights, freezers, bath-houses and laundries.

### Municipal Division

In 1970 the Municipal Division administered a grant assistance program totalling \$863,000 and issued debenture loans totalling \$1,091,500. In co-operation with local councils, capital projects are approved which are of direct benefit to the population. Water-sewer extensions, road paving, sidewalks, streetlighting and fire prevention constitute the main items at the present time. Continued guidance and technical assistance were provided to the municipalities to meet the rapidly growing complexity in volume of work facing local councils.

### Housing Division

The Division co-ordinates with the federal Department of Indian Affairs and Northern Development, providing low-rental housing for Eskimos and Treaty Indians in the Territories. When the Eastern Arctic housing stock was added on April 1st, 1970, the responsibility totalled 1,910 units throughout the Northwest Territories. During 1970, 175 new three-bedroomed units were constructed throughout the Territories bringing the total inventory to 2,085. A total of 52 houses were constructed during 1970 under the Territorial Rental Housing Program which provides low-rental housing for persons other than Treaty Indians or Eskimos, so as to place all ethnic groups on an equal footing. There are a total of 106 units under this program. Also during 1970, National Housing Act public housing programs progressed in Fort Smith, Hay River, Yellowknife and Inuvik. In addition, a 17-unit one-storey apartment was completed for and occupied by senior citizens in Yellowknife and construction was started on a similar type of apartment complex for senior citizens at Fort Smith which will contain 8 units.

### Town Planning and Lands Division

The Town Planning and Land Division has requested the transfer of lands from the federal government to the commissioner for 18 settlements and incorporated municipalities. Of these, 3 were transferred in 1970 – Yellowknife, Inuvik and Edzo. In June the new Commissioner's Lands Ordinance was passed and final work was done on the regulations. The regulations encompass all aspects of the surface rights such as land surface and timber and clearing rights. The mineral aspects remain with the federal government. Development plans for Fort Good Hope and Norman Wells were completed in 1970, and planning studies were undertaken at Pine Point, Fort Providence and Fort Simpson.

### Recreation Division

The main event of the year came in March 1970 when the Northwest Territories hosted the first Arctic Winter Games with teams entered from the Yukon, Alaska and the Northwest Territories. The Territorial Experimental Ski Training Program is progressing well and the Inuvik skiers are gaining international recognition. Swimming was the most extensive program conducted in 1970, assisted by the construction of a portable pool on a barge which stopped at communities along the Mackenzie River providing swimming instruction to the communities.

### Civil Emergency Planning

The civil emergency planning officer travelled extensively during 1970, visiting 22 settlements in the Mackenzie and Western Arctic. In 1971 plans are to extend service in the Eastern Arctic.

## DEPARTMENT OF EDUCATION

### Responsibilities

Curriculum, school services, adult education, vocational programs.

### Review of 1970 Operations

Developments in curriculum and in community participation in the process of formal education characterized the Territorial government's department of education activities in 1970. The people of the Rae-Edzo area elected a special school committee which will have as one of its principal objectives the operation and management of a special experimental school-hostel facility scheduled to be opened in the new townsite of Edzo in the fall of 1971.

### Enrolment

In September 1970, a total of 10,311 pupils were enrolled in the Northwest Territories schools, including 4,264 Eskimos, 1,731 Indians and 4,316 others. This was an increase of 1,279 pupils or 7.9% over the previous year. Pre-school education is being extended and kindergartens now exist in 27 settlements with a total enrolment of 638 pupils. The goal is to extend this program to all 5-year-olds in the Northwest Territories.

### Adult Education

Communities throughout the Northwest Territories continued to request classes in adult education with a special emphasis on learning English and upgrading the levels of education of individuals with little formal education. A community leadership training workshop was held in the Adult Education Centre at Chesterfield Inlet in June with 30 people attending from the Mackenzie and Keewatin regions. A community adult educator was appointed to Eskimo Point in the Keewatin where an adult education centre was established and an adult education centre was established at Pond Inlet.

During 1970, 10 co-ordinators worked with 82 local leaders who in turn worked with 1,656 families on the Social and Housing Education Program.

### Vocational Programs

The year 1970 was highlighted by the growth of the Adult Vocational Training Centre at Fort Smith. The centre has grown to accommodate 100 students in such vocational training areas as telecommunications, certified nursing assistant, carpentry, welding, heavy-duty mechanics, heavy-equipment operations, and academic upgrading.

At Sir John Franklin Vocational High School, there were 485 students enrolled, including 12 students from the Eastern Arctic. In the Inuvik region 14 trainees were signed up for training on the job at the Arctic Red River saw mill. At the Churchill Vocational Centre there were 170 students from the Keewatin and Baffin regions following occupational, vocational and academic programs. Along the Mackenzie Valley and in the High Arctic, oil exploration provided many opportunities for the training and employment of Northerners. More than 450 placements of Northern residents were made in oil exploration activities.

### Post-Secondary Education

A total of 135 students received financial assistance under the Northwest Territories Students Grants Program in 1970, as compared to 116 in 1969. Financial assistance is made available in the form of outright grants for payments of tuition fee, text books, transportation costs, and the costs of board and lodging. Another 10 students received bursaries of \$1,500 each.

### Curriculum

A beginning in direction of a northern primary level curriculum was launched at the Kugluktuk school in Coppermine. The project is aimed at the creation of a primary curriculum relevant to the native child. Increased attention is paid to the introduction and utilization of native languages in school programs not only for instructional purposes, but also for the psychological and cultural benefits. With the assistance of the Northern Co-ordination and Research Centre progress was made in the area of preparing a Dogrib grammar-dictionary. When completed, these resource materials will be made available to classroom teachers who will be working with Dogrib Indian Children. Greater use was made of audio-visual equipment and there is now a stock of 1,800 titles in the film library.

### School Construction

A major project during 1970 was the start of construction of a new 15-room school and a 100-bed pupil residence at Edzo near Rae, for opening September 1971. In the Eastern Arctic, construction commenced on an occupational high school consisting of 16 classrooms and 10 shops in Frobisher Bay, also to be ready for opening in September, 1971. A new high school is also being constructed at Hay River.

### Teacher Training and Recruitment

The Northwest Territories Teacher Training Program entered its second year of operation in September, 1969, with 13 young Northerners entering selected classrooms in the schools in the Mackenzie area. They taught in classrooms where the teachers, the students, and the community in general, were more easily able to relate to each other because of the similarity of their cultural backgrounds. In September 1970, 18 Northern students enrolled in the Teacher Education Program which now extends over a two-year period. At the end of their training the students will be granted an interim Northwest Territories Teachers' Certificate. In September, 1970, there were 351 teachers employed in the Mackenzie area by the Northwest Territories government. In addition, the Yellowknife Public School Board employed 36 teachers and St. Patricks Roman Catholic School in Yellowknife employed 22 teachers. In the Keewatin and Baffin regions there were 140 teachers employed with 22 teachers on staff at the Churchill Vocational Centre.

In many schools in the Northwest Territories, classroom assistants are employed to aid the school staff in a variety of ways. The assistants are Northern people who have grown up, and in most cases received the majority of their schooling in the community in which they work.

## DEPARTMENT OF SOCIAL DEVELOPMENT

### Responsibilities

Social assistance, blindness and disability allowances, child welfare, medical-social services and rehabilitation, corrections and alcohol education.

#### Review of 1970 Operations

### Social Assistance

In the Social Assistance Program a review of food costs in all communities was completed and proposals were made for bringing allowances into line with current costs. A citizens advisory committee was established in Fort Smith to advise the Department of Social Development on methods of improving its policies. The committee has been concerned with ways of finding employment for persons who have applied for social assistance because employment opportunities were not available.

### Social Service Aids

The Social Service Aid Training Program was instituted in the Inuvik region. Five native residents from Inuvik, Aklavik, Fort Good Hope, Fort McPherson and Tuktoyaktuk attended the course and in March they returned to their own communities to assist in providing services. They took over the administration of social assistance and work in other social areas, such as working with families having difficulty caring for children and working with foster parents.

### Child Welfare

As of March 31, 1970, there were 212 children in permanent care of the Superintendent of Child Welfare. There were also 36 children in temporary care during the 1969-70 fiscal year and 64 children were placed for adoption.

### Medical, Social Services and Rehabilitation

At present there is an average of 30 persons who require special care and are accommodated in hospitals or other institutions in the Territories. In many instances institutions in the provinces must be contracted with for these services, particularly institutions for the mentally retarded. The need for housing, supervisory care and health services for old persons has been recognized through construction of senior citizen housing in Yellowknife, accommodating 17 and Fort Smith which will accommodate 8. Plans have been formulated for similar housing in Inuvik, Hay River, Fort Simpson and Fort McPherson.

### Alcohol Education Program

The Alcohol Education Program is presently concentrating its services in Yellowknife, Inuvik, Fort Smith, Hay River and Frobisher Bay. The Yellowknife Committee of Concern on Alcohol Problems continues as an invaluable aid to the program and the Inuvik Committee of Concern succeeded in developing a drop-in centre program in 1970 which provides a non-drinking environment as an alternative to the bar for recovering alcoholics. The hiring of an additional community alcoholism worker in late 1970 enabled the program to devote more attention to a number of communities on the Arctic coast and in the Keewatin.

### Corrections Services

In 1970 an extra-departmental committee was formed to examine in detail all aspects of the corrections program to determine how effectively the existing services meet current needs. The report was to be completed early in 1971 and submitted to the June session of the Northwest Territories Council.

The Yellowknife Correctional Institution operates as a rehabilitation centre for members of the Northern population who had difficulty living within the law. It obtains its objectives largely by means of academic, vocational and social education. In the past year, 195 men and 45 women were admitted, serving sentences averaging 94 and 31 days respectively. There was an increase in the quantity of case and work loads for the probation service. During 1969-70 the probation service dealt with 646 persons compared to 597 in 1968-69.

## DEPARTMENT OF INDUSTRY AND DEVELOPMENT

### Responsibilities

Promoting and assisting industrial development, tourism, and game administration.

## Review of 1970 Operations

### Research and Planning Section

During 1970, the planning section concluded studies on the forest products industry, local labour and housing construction, and the feasibility of a bridge across the Mackenzie River. The forest products industry study indicated a good potential for expansion and suggested the direction in which the industry could develop. There were indications that an increase is possible in the hiring of local labour and the use of local material in housing construction. Studies now under way include an air route study, a study of the rapidly expanding fishing industry and a continuing review of the Northern Oil and Gas Exploration Program.

### Training

During 1970, a program to train indigenous residents as guides to ensure them increased participation in the tourism industry was initiated. An assistant game management officer course was initiated in July and the five successful graduates are now obtaining experience under qualified game management officers in the field. The first of the series of junior officer management courses to train indigenous managers for employment in the government and in industry is scheduled to begin early in 1971.

### Industrial Development Division

Total production of arts and crafts in the Northwest Territories increased 30% to approximately \$1,250,000 in 1970. New handicraft centres were opened at Fort Simpson, Fort Resolution, Yellowknife Indian Village and Spence Bay. A project in industrial weaving was initiated at Pangnirtung where they are producing sweaters, scarfs, mitts etc., for sale both in the Territories and throughout Canada.

Commercial fishing production continued to rise at a satisfactory rate and in 1970 production rose 14.5% to 4,929,042 lbs and increased in value 42% to \$1,447,000. During 1970, loans totalling \$188,000 were made to 67 fisherman from Hay River, Rocher River, Fort Resolution and Yellowknife under the Territorial Fishermans' Loan Fund.

The Territorial Small Business Loan Fund came into operation to provide funds to assist in financing small business enterprise resident businessmen planning to establish in the Northwest Territories. The amount of \$300,000 was available for this purpose in the fiscal year ending March 31, 1971. An N.W.T. grade stamping agency was formed and had been accepted as a member of the Canadian Lumber Standards Industry Committee.

Gross income for Territorial co-operatives in 1970 was about \$2,000,000 with over 50% of this total being contributed directly to local settlements.

### Tourism Division

A combination of unique special events, centennial publicity, and an ever-growing public awareness in the Northwest Territories, served to attract a record number of tourists in

1970. During the 4-month season, June to September, 1970, an estimated 17,000 persons visited the Northwest Territories, compared with the yearly total of 12,419 in 1969. Tourists spent an estimated \$5,000,000 compared to about \$3,000,000 in 1969. Construction of two community camp grounds was started in 1970 while work continued on three community camp grounds and one roadside camp ground, started in 1969. Three camper trailer caravans, totalling about 140 vehicles, made visits to the Northwest Territories for the first time, as part of the group tours program. Travel counselling continued as a high-priority function and more than 17,600 personalized replies were mailed out in answer to enquiries from potential visitors.

### Game Management Service

The total fur production for 1969-70 was valued at \$934,600 compared to \$1,160,000 in 1968-69. The decrease reflects the lower production of white fox, beaver and muskrat. The fur marketing service is now available to most communities in the Northwest Territories and as a result trappers wishing to ship their products to southern fur auctions may receive an advance payment by cheque at the time of shipping. Final payment is made by the auction when the fur is sold.

Polar bear sports hunting was legalized on a controlled basis for both residents and non-residents. The sport hunting functions entirely within the existing quota system. The program was initiated in the two settlements of Sachs Harbour and Resolute Bay with their respective community associations acting as the outfitting agency. Aerial surveys were carried out to arrive at population figures for the musk-ox and caribou on Banks Island, as well as surveys in the Bathurst Inlet area covering the same species.

## DEPARTMENT OF THE TREASURY

### Responsibilities

The financial affairs of the government of the Northwest Territories and the centralized procurement of equipment and material.

### Review of 1970 Operations

The government's operating and capital requirements for the year were financed from three sources:

- receipts consisting of fees, taxes, licenses and the liquor system sales;
- recoveries from the other governments under cost-sharing arrangements;
- deficit grants and loans under a one-year federal-Territorial financial agreement.

**Financial Statement**

Expenditure and revenue for 1969-70 were as follows:

**Expenditure**

Operations and maintenance	
Education	\$ 7,465,328
Public works	7,459,114
Local government	3,989,261
Administration	3,775,837
Health	3,350,167
Social development	3,159,420
Industry and development	1,971,868
Territorial secretary	1,119,143
Territorial treasurer	721,110
Centennial	225,048
	\$33,236,296
Loan amortization	
Interest on Government of Canada loans	1,020,523
Project capital	7,022,499
	\$41,279,318

**Revenue**

Operation and maintenance revenue	
Tax revenue	\$ 2,130,139
Liquor system-net profit	2,148,298
Staff housing rental recoveries	735,365
License and fee revenue	684,539
Interest on bank deposits	454,301
Sundry	189,431
Resale of heating fuel and power	145,480
Sale of land	41,959
Refund of previous years' expenditure	8,612
	\$ 6,538,124

**Expenditure recoveries under federal-territorial cost sharing agreements**

Transfer grants-new programs	\$12,491,600
Health	2,185,353
Indian and eskimo Northern housing	905,500
Public works	891,094
Centennial	290,000
Social development	237,876
Education	190,964
Local government	102,933
Industry and development	22,500
	17,317,820
Government of Canada operating grant	8,718,409
Loan amortization	
Government of Canada grant	1,615,709
Interest on municipal and housing loans	53,181
	1,668,890
Project capital recoveries	2,142,712
Total	\$36,385,955
Excess of expenditure over revenue	4,893,363
	\$41,279,318

**Financial Operations Division**

The mainstream of financial transactions flow through this division including payroll, revenue collection and payment of accounts, as well as estimates and budget preparations. In April, 1970, a third-generation computer facility began operating for the government, the first installation of its kind north of 60.

**Purchasing and Supply Division**

Significant progress was made in 1970 towards completion of a three-year program designed to improve service to all levels of government. The objectives are to: (a) provide increased economy to regional directors; (b) reduce stockholdings at regional warehouses and all settlements; (c) eliminate the annual re-supply concept for operation and maintenance supplies; (d) assume total responsibility for material management in the Baffin and Keewatin regions.

**Special Projects and Costing Division**

The Special Projects and Costing Division is responsible for designing and refining special purpose accounting systems and providing professional accounting services to all government departments. During 1970, a major costing system for operation and maintenance for the Mackenzie Highway was developed and implemented.

**DEPARTMENT OF PUBLIC WORKS****Responsibilities**

All aspects of public works operations including design, construction and maintenance of roads, buildings and municipal-type services.

**Review of 1970 Operations****Design Division**

The Design Division undertook a wide variety of projects during 1970. The total value of projects handled by its own or through consultants, was approximately \$14,600,000. The division has been analysing construction costs in relation to project types, materials, techniques and the important factor of logistics. When more data on design and other factors has been accumulated, it is the division's aim to produce the information in a form that will be of value to private as well as government developers.

**Construction Division**

In 1970, the total value of all construction projects administered was in excess of 7 million dollars. Some of the major programs undertaken on behalf of various departments were: the supply and erection of 136 low-rental houses; construction of the new school at Edzo; campground construction at Fort Smith, Hay River, Fort Providence and Fort Simpson; some housing construction for Territorial government staff.

### Highways Division

Main projects carried out in 1970 for the Territorial government or the federal Department of Indian Affairs and Northern Development included: maintenance of the Mackenzie Highway system and connecting resource development roads; administration of a tote trail financial assistance program to help entrepreneurs develop or explore resource potential; and construction of roads in the settlements of Aklavik, Arctic Red River, Fort Good Hope, Fort Franklin, Fort Norman, Fort McPherson, Fort Resolution and the Yellowknife Indian Village.

The highway extension to Fort Simpson was carried out under the supervision of the federal Department of Public Works. The 180 miles highway extension will have cost approximately 8 million dollars and will increase the total length of the Mackenzie Highway system to almost 1,000 miles.

### Operations and Maintenance Division

This division has responsibility for operation and maintenance of government buildings, fuel installations, plants and vehicles; and for the supply of heating and power services. The division assumed responsibility in the Eastern Arctic in 1970 resulting in an increased program fund from \$4,578,500 in 1969-70 to \$11,051,500 in 1970-71.

### Ferry Operations

The ferry *Johnny Berens* was operated at the Mackenzie River crossing on the Yellowknife Highway. Approximately 18,000 vehicles were transported during the 1970 season, which was an increase of 4,000 vehicles over 1969. A ferry service was implemented on the Liard River crossing of the highway extension to Fort Simpson, while the highway was still partially under construction but passable with some difficulty.

## DEPARTMENT OF THE TERRITORIAL SECRETARY

### Responsibilities

The general administrative services within the Territorial government, administration of a variety of ordinances, labour standards and direction of the Territorial Public Library Services.

### Review of 1970 Operations

### Administrative Services

The division is responsible for unit involved in developing, producing and distributing all manuals, regulations and orders for the Territorial government, in addition to registry, transcribing and communications. The telex unit in administrative services now handles a greater volume of two-way traffic than any other rental installation of CNT in Canada.

### Administration of Ordinances

The polar bear licence plate, developed for Centennial Year, went on sale January 1, 1970. This licence plate has generated much interest among collectors and almost 500 souvenir plates were sold. Normal sales and vehicle registrations for the year total 7,781. Steps were taken early in 1970 to relieve the Canadian Mounted Police of administration responsibilities under the Vital Statistics Ordinance; registration of births marriages and deaths is now the function of the municipalities and the Territorial government.

Project Surname, a centennial program with the eventual aim of eliminating Eskimo disc numbers is nearing completion. The project director, Abraham Okpik, visited every settlement where Eskimo people live and was able to contact and interview every head of family. For those persons wishing a surname in place of a disc number, alterations were made and official changes processed through the Change of Name Ordinance. The project involved some 12,000 persons and changes will be made to approximately 95% of the names involved.

### Labour Division

The Labour Standards Ordinance was amended to raise the minimum wage from \$1.25 an hour to \$1.50 an hour. Responsibility for workmen's compensation was transferred from the Department of Indian Affairs and Northern Development to the government of the Northwest Territories on October 1, 1970. A total of 1,355 claims were handled and total compensation paid amounted to \$163,406 with medical payments reported at \$165,631.

There were generally excellent labour-management relations during 1970 and there was only one wildcat strike of short duration at Pine Point mines.

### Public Library Services

The headquarters for the N.W.T. public library services is at Hay River and there are now 14 member libraries servicing almost all of the Northwest Territories. During 1969-70, approximately 61,000 books were borrowed from the library service. Two new libraries were started at Fort McPherson and Tuktoyaktuk. The Childrens Services Program of school visits received enthusiastic support during the 1969-70 school year: 132 classes covering grades 1 to 8 were visited in 12 communities in the Mackenzie area.

## DEPARTMENT OF INFORMATION

### Responsibilities

To provide a centralized service in English, Eskimo and Indian languages to interpret the government's aims and objectives to the public; to produce a variety of government publications; operation of the government's central printing unit.

## Review of 1970 Operations

The efficiency of the Department was improved by the creation of two divisions allowing concentration in the areas of publications and public relations.

### Public Relations Division

In its public relations capacity the Department of Information works with other Territorial departments to solve problem areas such as the adverse publicity on the Polar Bear Sports Hunting Program. The concern expressed by many people in southern Canada about this program was largely due to misunderstanding and an information program helped clear up many misconceptions. A new Eskimo translator was hired to fill the position of Translator-Information Officer. He is involved with many news gathering and public relations aspects of the department. He produces a monthly Eskimo news letter which has a circulation of about 2,500 and is written in both Eskimo syllabics and English.

Over 150 news releases were issued in 1970 as well as related background material to the news media. Greater use was made of telex facilities to ensure quicker reception of information.

### Publications Division

A major project of the Publications Division is production of the commissioner's annual report. The 1969 edition received acclaim from persons throughout the North and in southern Canada and work was completed on the 1970 annual report which was a colorful hard-covered issue with special sections on Centennial and the Queen's tour. A design artist was hired in 1970 and he is assisting in the production of a number of general information publications which will be needed to meet the growing demand for information on the Northwest Territories.

The Department of Information assumed responsibility for the printing section of the Territorial government in 1970 and a number of technical changes were made to provide a more efficient and productive system.

## DEPARTMENT OF LEGAL AFFAIRS

### Responsibilities

Provision of legal services to the Territorial executive and senior officers of the different departments of the public service; adviser to the council of the Northwest Territories; drafting of legislation, regulations and orders; administration of the land titles office.

## Review of 1970 Operations

During 1970, 39 bills were drafted for presentation to council. Planning progressed in the Department of Legal Affairs during 1970, for the assumption of responsibilities

early in 1971 for the magistrates court and supports staff of the Territorial court, and responsibility for justices of the peace and coroners.

## DEPARTMENT OF PERSONNEL

### Responsibilities

The Personnel Administration Program of the government; the development of manpower planning; appraisal and development of training programs; the development and administration of compensation and benefit programs; recruitment and staffing of positions; and employee accommodation.

## Review of 1970 Operations

### Staff Relations

This office is responsible for the negotiation of collective agreements as well as their administration. Collective agreements were negotiated with the Northwest Territories Teachers' Association and the Northwest Territories Public Service Association in 1970.

### Compensation and Benefits

A basic classification and pay plan was developed during 1970 and a constant review is under way on the development of a comprehensive benefits program.

### Personnel Services

There are 1,954 established positions in the Northwest Territories government including teachers, and as of October 31, 1970, there were 1,720 of these positions filled. This division put a great deal of work into briefing and personal consultation with federal employees in the Baffin and Keewatin regions before they transferred to the Territorial government on April, 1970.

### Employee Accommodation

A uniform housing inventory control system was devised and established in each of the four regional headquarters as well as in Yellowknife. The system aids in allocation of accommodation and planning for future requirements. In addition to this system a basic classification process was established which enables the allocation of housing accommodation based on tangible requirements of the employee.

## FINANCIAL AND MANAGEMENT SERVICES

### Responsibilities

A support unit service designed to provide the executive and government departments with financial and management advice.

### **Review of 1970 Operations**

In 1970, a study was done on supply operations and the recommendations made were approved by the executive. During 1970, financial audit responsibilities were transferred from the Treasury Department to Financial and Management Services. At the request of the department of local government an accounting system for hamlets was developed.

More than 20 studies were completed to aid departments in finding better ways to control expenditures of men, material and money. A complete graphic picture of the government showing all positions on an organization chart was also drawn up in 1970.

## **LIQUOR CONTROL SYSTEM**

### **Responsibilities**

A special unit with responsibility for the administration of the liquor control system in the N.W.T.

### **Review of 1970 Activities**

In May 1970, the liquor control system was withdrawn from the Department of Treasury and established as a separate unit. As a direct result of the report of the board of liquor enquiry, a new liquor ordinance was drafted and presented to council. It was approved and came into force in July 1970. The new ordinance provides for the establishment of the Liquor Control Board which is the liquor licensing authority for the government, while having general advisory powers on all matters relating to the handling and control of liquor. The general manager of the liquor system acts as secretary to the board.

Revenue from all sources in the liquor system increased by 20% in 1969-70, and from gross revenue of \$4,800,000 a net profit of \$2,150,000 was derived. The liquor system operated six liquor stores, and three liquor and two beer agencies in 1970.

## **CLERK OF THE COUNCIL**

### **Responsibilities**

To supply support services to the council of the Northwest Territories, secretariat services to the Territorial legislation policy committee and liaison with the chief electoral officer for Canada.

### **Review of 1970 Operations**

The office of the clerk of the council serviced three council sessions in 1970. In preparation for these, 40 bills and 58 other documents were published in the appropriate form for

presentation to Council. The clerk of the council's office edited, printed and distributed the hansard-style debates and made arrangements for the printing of legislation by Information Canada in booklet form.

In preparation for the Territorial general election held on December 21, the clerk of the council's office assisted in arranging a returning officers' course conducted in Yellowknife in August by officials from the office of the chief electoral officer for Canada. A profitable liaison with the clerks of other legislative bodies was established by the attendance of the clerk of the council at the second annual meeting of the Association of Clerks-at-the-Table in Canada, held in Edmonton.

## **FIRE MARSHAL'S OFFICE**

### **Responsibilities**

Investigation of fires, organization and training of settlement fire brigades, review of building plans, inspection of public buildings, development of public fire prevention education programs.

### **Review of 1970 Operations**

In 1970, for the first time, the fire marshal's office had residing fire inspectors in the Keewatin and Baffin regions. This complemented the staff of the fire marshal's office in Yellowknife. The biggest single fire hazard was found to be dripping oil lines followed closely by abuse of electrical wiring and appliances. Increased inspection has helped to curb the number of fires and dollar loss.

Great importance was attached to training fire brigades in their own environment using their own equipment. In February, 1970, 36 fire chiefs and firemen attended a four-day fire chiefs' course at Hay River.

One tracked fire-fighting vehicle went to Igloolik in 1970 and four new conventional fire trucks went to Wrigley, Fort Providence, Rae and Fort Resolution. New fire halls were designed for Fort Providence and Resolution.

## **HEALTH INSURANCE SERVICES**

### **Responsibilities**

Administration of the Northwest Territories medical care plan and Territorial hospital insurance services operation.

### **Review of 1970 Operations**

During 1970, the Council of the Northwest Territories approved an ordinance to provide Medicare services for residents of the Territories. Work on the plan during 1970 included liaison with the Department of National Health and

Welfare to reach agreement on cost-sharing arrangements and production of a fee schedule. Planning also progressed on the registration of all Territorial residents so that the plan could come into operation on April 1, 1971.

Responsibility for the operation of the Territorial Hospital Insurance Services Program was transferred from the federal government to the government of the Northwest Territories in October, 1970. In 1969, a total of 8,183 adults and children received in-patient services under THIS and for the first half of 1970 admissions for adults and children were about 5,339.

## **SPECIAL PROJECTS GROUP**

### **Responsibilities**

Planning progressed for the establishment of a small special projects group in early 1971 with particular responsibility for studying the transportation and communications problems in the N.W.T., and proposing solutions to them.

## GOVERNMENT OF THE YUKON TERRITORY

### ADMINISTRATION OF THE YUKON TERRITORY

#### Responsibilities

To administer the Yukon Territory in accordance with the Yukon Act and other federal laws applicable thereto, and the ordinances of the Yukon Territory.

#### Review of 1970 Operations

Effective November 1, 1970, the organizational structure was revamped to provide for the establishment of an executive committee comprised of the commissioner as chairman, assistant commissioner (executive), assistant commissioner (administrative) and two members of the council. All members of the executive committee have direct line responsibility for various departments within the Territorial government. One council member on the executive committee is responsible for the day-to-day administration of the Department of Health, Welfare and Rehabilitation and the other for the Department of Education.

Another significant change was the establishment of an administrative and legislative support services group composed of clerk of council, personnel adviser, financial adviser and statistical and planning adviser, reporting directly to the commissioner.

#### Plans for 1971

Negotiations are progressing favorably towards the takeover by the Yukon Territorial government of the administration of justice within the Territory, the target date for the takeover is April 1st, 1971.

Negotiations are progressing towards takeover, by the Yukon Territorial government of the maintenance of the Alaska Highway.

Considerable land has been transferred to the control of the Commissioner of the Yukon Territory from the Crown, which will necessitate additional administrative responsibilities.

### COUNCIL OF THE YUKON TERRITORY

#### Responsibilities

To exercise legislative powers comparable to those of a provincial legislature.

#### Review of 1970 Operations

An important milestone in the history of the Yukon was attained with the appointment of two council members to the executive committee of government following the 1970 fall election of Territorial council.

The council was convened for four sessions during 1970. The first was from January 13 to February 6, the second from March 31 to April 16, the third from June 22 to July 3, and the fourth from November 4 to November 13.

During the first session, 12 ordinances were passed, the more notable of these being an ordinance to provide for the welfare of children, and an ordinance to provide for government control and sale of alcoholic liquors. It was during this session that council, by motion, requested that the Yukon Workmen's Compensation Ordinance be administered in the Yukon.

As an attempt to bring the legislative arm of Government in close visible contact with the people of Yukon, the first week of the second session of 1970 was held in the former capital of the Territory, Dawson City, for the first time in 17 years. During the second session, 15 ordinances were passed, including an ordinance respecting securities and the 1970-71 budget.

The first week of the third session was held in Watson Lake as a further attempt to bring the government to the people. During this session, eight ordinances were passed, the more notable of these being an ordinance to enable the commissioner to transfer all the streets and lanes in the city of Whitehorse to the City of Whitehorse, and ordinance to amend the elections ordinance, and an ordinance to incorporate the village of Faro.

The fourth session was called to administer the oath of office to the newly elected members of council and to elect a speaker, deputy speaker and chairman of committee, as well as to formulate membership to various boards and committees. It was during this session that appointments were made to the executive committee by the commissioner following recommendations from council.

#### Plans for 1971

It is anticipated that with the advent of two elected council members on the executive committee of government, benefits

would be obtained by means of input of council into administrative decisions.

## ADMINISTRATIVE AND LEGISLATIVE SUPPORT SERVICES

### *Personnel Adviser*

#### **Responsibilities**

The personnel office is responsible for the administration of the public service ordinance, the Yukon public service staff relations ordinance, and the Yukon public service superannuation ordinance.

Responsibilities of the office include the staffing function for the civil service and for teachers, classification administration, pay research and administration, collective bargaining and employee relations, employee health, welfare and pension plans, staff establishment and organization, employee appraisal, and the interpretation and application of personnel policy.

#### **Long-term Plans**

Long-range plans for the personnel office include the development and co-ordination of a comprehensive program of manpower planning and utilization including employee appraisal, training and development.

#### **Review of 1970 Operations**

During the period under review, 84 permanent and 76 casual for a total of 160 teacher appointments were made. Over this same period, 325 permanent and 672 casual appointments for a total of 997 appointments were made to the civil service. In all, 1,157 permanent and casual appointments were made during the fiscal year.

In August of 1970, employees in the public service obtained collective bargaining rights with the implementation of the Yukon public service staff relations ordinance. The Public Service Alliance of Canada was subsequently certified as bargaining agent and following negotiations in December, 1970, and January, 1971, a collective agreement was concluded. The agreement is effective from April 1, 1971 to March 31, 1973.

During 1970-71, 37 amendments to the classification and pay plan were processed along with 89 classification transactions.

A limited training program was maintained consisting of payment for correspondence courses taken by employees and the sending of middle-management representatives to a variety of short programs of study sponsored by other governmental or educationally oriented institutions.

#### **Plans for 1971**

During 1971-72 the employee relations function will receive a good deal of attention with emphasis placed on the

uniform application of contract provisions and the establishment and maintenance of effective relationships with the Yukon Public Service Staff Association and the Public Service Alliance of Canada.

### *Clerk of Council*

#### **Responsibilities**

To provide legislative support services to the council of the Yukon Territory, and administrative support services to the office of the commissioner.

#### **Review of 1970 Operations**

With the reorganization of the administrative structure of government on November 1, 1970, establishing an administrative and legislative support services group, the office of the clerk of council (formerly a division of the Department of the Territorial Secretary and Registrar General), was established. The office of clerk of council consists of the clerk of council, who is also the secretary of the executive committee of government, the assistant clerk of council, and a full-time staff of three, engaged in a variety of recording, typing, transcribing and record-keeping activities.

#### **Plans for 1971**

A major project for the clerk of council in 1971 will be the consolidation and revision of ordinances of the Yukon Territory, which was last done in 1958.

The clerk of the council plans and organizes official tours of the Territory and performs special assignments involving visiting dignitaries in Yukon.

Continued program-updating is necessary to provide legislative support services to the council of the Yukon Territory and administrative support services to the office of the commissioner.

## DEPARTMENT OF EDUCATION

#### **Responsibilities**

- To provide elementary and secondary educational facilities for the students of the Yukon Territory. Yukon elementary and secondary schools are operated in accordance with the provisions of the Yukon Schools Ordinance.
- To provide technical and vocational training to students who desire to work in the expanding trades of the Yukon Territory.
- To provide re-training and re-education for the present Yukon labour force.

#### **Long-term Plans**

Improvement and expansion of the present program and facilities to meet the needs of an expanding Yukon populace.

## Review of 1970 Operations

### Elementary and Secondary Schools.

In September 1970, the school population was 4,528 which represents a 13.54% increase over the June, 1970, figure. By January, 1971, the total had risen to 4,545. There are 22 public and separate schools in the Yukon with a teaching force of 230 full-time teachers. The Van Gorda School at Faro extended its intake of students to grade 10 and the Mayo School added grade 12 courses. Jack Hulland School at Porter Creek had three classrooms added and portable classrooms were added at Mayo, Selkirk Street School and Takhini School.

The community kindergarten program has expanded to include most of the communities in the Yukon. The grant and scholarship scheme continues to make a substantial contribution to the post-secondary educational opportunities for Yukon students. By February, 108 students had qualified for grants and/or scholarships and 29 applications for Canada Student Loans were approved.

Second-language instruction was extended to the upper levels of the elementary school in many communities and parent-teacher interviews have replaced or complemented the issuing of report cards for students in the elementary grades.

During the year a new elementary science program was introduced which uses a totally experimental approach. This is the first of a two-phase program to implement a program-solving rather than a factual approach.

### Plans for 1971

The increasing school population will see work start on additions to school facilities in Whitehorse and Faro with portable classrooms being added in a number of other centres. Subject to suitable applicants coming forward, two or three Yukon students will be sponsored to attend the Northwest Territories Teacher Education Program at Fort Smith, N.W.T. The larger schools will also employ data processing for their student reports, attendance records, and school timetable construction.

The increasing number of post-secondary education grants and scholarships indicate that sufficient interest has now been generated in this area of education to warrant the conducting of a feasibility study for the establishing of post-secondary education facilities in the Yukon.

Continuing emphasis will be given to the reading program in the elementary grades and a supervisor of reading will be appointed to assist students and teachers in those schools where diagnostic tests reveal weaknesses in the pupils' achievements.

### Vocational and Technical Training Branch

The continued increase in requests from the work force and management in industry, commerce, and the Department of Manpower and Immigration resulted in further expansion of adult training programs in the Yukon.

Total applications for training increased by 46% over the previous year to 594, with the September intake increasing 46% to 362, and the February intake increasing 137% to 232.

Of the total 216 approved for the September intake, 181 enrolled, and the 132 applicants approved for the February intake combined with the 117 trainees already on course for a total February enrolment of 249.

Mr. J. Putters was appointed principal of the training centre and five instructors were appointed to fill vacancies resulting from resignations. An additional instructor was appointed to the nursing assistant course as a result of the hospital staff organizational change.

A number of special short-term updating and upgrading courses were provided to meet specific needs of various Yukon industries and associated work forces. Six of the instructors were under contract to provide instruction, while others were specialists provided by major equipment manufacturers and suppliers. Special management and supervisory training courses were provided by contract with the British Columbia Research Council, and a five-month basic mining exploration course, with 33 trainees enrolled, was conducted in a portable classroom at Ross River.

The apprenticeship training regulations were approved and tradesman qualification examinations are in effect for the automotive, journeyman carpenter, heavy equipment (motor transport), heavy equipment (construction), industrial electrician, and hairdresser (cosmetologist) trades. Preliminary work was done towards the development of certification procedures for plumbers, and this should be completed during 1971. Participation of the trades employers and employees on the trade advisory committees was excellent and is tangible evidence of the importance of this function.

The Vocational Rehabilitation Services Board monthly meetings were well attended and experts in this field from Vancouver contributed considerably with advice and general information. A number of cases studied resulted in clients being referred to gainful employment after having had this work-training potential assessed at the Yukon Vocational and Technical Training Centre.

The adult education night school program continued to expand with 64 courses offered in Whitehorse, Dawson City, Mayo, and for the first time in Teslin and Haines Junction. A total of 675 trainees enrolled in 52 courses.

Plans for the future include an increase of programs for the mining industry, special vocational and development courses for the small communities throughout the Yukon and modifications of existing programs to ensure that the most relevant training is available to all Yukoners. Special supervisory training and management courses are scheduled for 1971.

## DEPARTMENT OF HEALTH, WELFARE AND REHABILITATION

### *Correction Branch*

### Responsibilities

The responsibilities of this branch fall into three main categories:

- Provision of adult and juvenile probation services. In addition to providing this service to the courts, supervision of parolees and probation transferees from federal and provincial institutions and jurisdiction is also undertaken.
- Operation of a juvenile training home for male juveniles declared by the courts to be delinquent.
- Operation of a medium-security institution, which consist of arranging for the custody, care and treatment of those people who have appeared before the Territorial courts and have been remanded or sentenced to terms of imprisonment of less than two years.

#### Long-term Plans

Present growth trends in the Yukon indicate that planning along the following lines should be made:

- Greater use of probation services is envisaged with more involvement by the community and the use of volunteer probation workers.
- Juvenile training home facilities will have to be extended to cater for the larger numbers of boys and girls appearing before the juvenile courts. The impending change in the juvenile age will throw considerable additional work on our resources in the area of juvenile offenders.
- There should be little need, if any, for any immediate additions to be made to the medium-security institution presently in use. It is envisaged that a more economical way of dealing with the majority of inmates, who are not security risks, is by the use of minimum-security work camps.

#### Review of 1970 Operations

In the calendar year 1970 a total of 384 inmate admissions was recorded at Whitehorse Correctional Institution, broken down as follows:

Males:	247 sentenced 113 remanded
Females:	19 sentenced 5 remanded

During the year, 18 juveniles were admitted to the Yukon Juvenile Training Home. In the same period, 12 were released for various reasons leaving the population at 11 on December 31, 1970.

Amendments to the liquor ordinance drastically reduced the number of female prisoners received. As the female section of the medium-security institution occupied almost one-third of the total floor area an agreement was entered into with the province of British Columbia to house female prisoners in that

province who are serving sentences of two months or more. This released the female section to be used as a young offenders unit housing, essentially, first offenders between the ages of 16 and 22.

The appointment of an academic instructor responsible for upgrading adult inmates and running normal classes at the training home added impetus to the program. At the present time, all juveniles and half the adult inmate population are taking some form of educational or vocational training.

#### Plans for 1971

Continued use of inmate work crews on selected community projects will be made and the extension of the vocational training centre facilities for admitting inmates to vocational training courses will be furthered. The first year of operation of mobile trailer units will be effected.

Some extension or adaptation of our present juvenile training facility will have to be made to cater for immediate problems which have made themselves apparent.

#### Health Services Branch

##### Responsibilities

To provide a comprehensive public health program to all residents of the Yukon Territory, on a cost-shared basis with the federal government.

##### Long-term Plans

Continued expansion of public health programs in line with population increases; advances in public health treatment and health programs which are present; increases in the scope of the present travelling medical clinics to outlying areas without resident doctors, and continued expansion of the scope of the dental health project for schools.

#### Review of 1970 Operations

- The operation of Mayo General Hospital was transferred from Territorial to federal administration in April, 1970.
- The new nursing station, known as the Father Judge Memorial Hospital, at Dawson City opened in December, 1970, and replaces the old Father Judge Memorial Hospital.
- Much public health time and effort was spent during 1970 on a program of adult immunization against diphtheria following a recent death from diphtheria.

#### Plans for 1971

- Expansion of the public health service in Whitehorse by the addition of an extra public health nurse for a total of five.
- It is intended to implement a system of internal treatment on selected patients in the DV program.

- Environmental health — it is hoped to increase the scope of this program by the recruitment of a third public health inspector.
- Whitehorse General Hospital — an intensive care unit should be operational early in 1971.

### Yukon Hospital Insurance Services

#### Responsibilities

- Administration of the Yukon Hospital Insurance Plan which provides the following as insured services to qualified residents of the Territory.

*In-Patient Benefits* — Standard ward care in an approved hospital within or outside the Territory at the approved per diem rate for the hospital, except that in the case of hospitals outside of Canada the maximum per diem rates payable by the service shall be \$40. (Canadian).

*Out-Patient Benefits* — Laboratory, radiological and other diagnostic procedures which require the use of hospital facilities together with the necessary interpretation for the purpose of assisting in the diagnosis and treatment of any injury, illness or disability. Payment for such services will be in accordance with the fee schedule issued by the Medical Services Branch, Department of National Health and Welfare.

- Development of the Yukon Health Insurance Plan as an integral part of the overall health services of the Territory.

#### Long-term Plans

- To introduce a health care insurance plan.
- To take over the operation and administration of all hospital facilities in the Territory currently the responsibility of Department of National Health and Welfare.

### Review of 1970 Operations

The number of hospital beds in the Territory (148) remained unchanged at the year end, although the closure of St. Mary's Hospital, Dawson City (10 beds) and the opening of Father Judge Memorial Hospital, Dawson City (5 beds) and Faro Nursing Station (5 beds) did improve the distribution of beds.

The volume of services provided by the plan and the cost of these services continued to increase, but the rate of growth was less than recorded in the previous year. Details of services and costs, together with comparable information for the previous year, are as follows:

<i>In-Patients</i>	<u>Services</u>		Increase or (Decrease)
	<u>1970</u>	<u>1969</u>	
Adults & Children			
Patient-days	29,603	28,386	1,217
Separations	3,554	3,483	71
Average length of stay in days	7.7	8.1	(0.4)
Newborn			
Patient-days	2,990	2,685	305
Separations	494	811	(317)
Average length of stay in days	6.0	3.3	2.7
<i>Out-Patients</i>			
Treatments	7,134	1,956	5,178
<u>Costs</u>			
	<u>1970</u>	<u>1969</u>	Increase or (Decrease)
In-patient services	\$1,143,280	\$1,029,198	\$114,082
Out-patient services	69,633	11,732	57,901
Administration	24,297	14,338	9,959
	\$1,237,210	\$1,055,268	\$181,942
Per Capita Cost	\$75.80	\$69.40	\$6.40

Recoveries from the Department of National Health and Welfare under the Hospital Insurance and Diagnostic Services Act are estimated at \$682,193 and from the Department of Indian Affairs and Northern Development at \$87,561 leaving a total of \$467,456 to be borne by the Territory. The proportionate costs to each are almost identical to those of the previous year, the greatest change being an increase of 2% in the case of Department of National Health and Welfare with the other two each recording decreases of 0.6%.

#### Plans for 1971

No changes are planned in the scope of benefits provided by the hospital insurance plan. The introduction of a health care insurance plan is scheduled in 1972 and preparatory work for this will be undertaken in 1971.

### Social Welfare Branch

#### Responsibilities

The Social Welfare Branch is responsible for the provision of an extensive and diversified program of social welfare services which includes the operation and administration of

government-owned facilities for the aged and for children. With the exception of services under the social assistance program, the Department provides a full range of social welfare services on the basis of need to all residents of the Territory. Social assistance to persons of Indian status continued to be administered by the Yukon Indian Agency of the Federal Indian Affairs Branch.

The major social welfare programs administered by the branch are: a) *Social Assistance*, b) *Categorical Assistance* and c) *Family and Child Welfare Services*. These major programs encompass a broad range of social services and supportive resources which are essential to the provision of an effective public welfare program. The branch also administers a housing program under which a small number of low-cost homes are constructed each year for welfare recipients with dependents.

The branch is also responsible for the operation of — a) three senior citizens homes, b) one nursing home, c) one receiving home for children, d) one group home for adolescent children, e) one home for multi-handicapped children, f) two district welfare offices, and g) a branch office in Whitehorse which accommodates the social assistance division and the homes and institution section. Total staff of the Branch during 1970 was 50.

Legislative responsibilities of the branch are:

- social assistance ordinance,
- child welfare ordinance,
- old age assistance and blind persons allowance ordinance,
- disabled persons allowance ordinance.

#### Long-term Plans

In view of the lack of specialized child-care resources in the Yukon and the increasing difficulty in securing placements in treatment centres and management facilities in the southern provinces, the branch will continue its planned program of development of the specialized facilities required to meet the needs of the increasing number of mentally handicapped and severely emotionally disturbed children being admitted to the protective care of the branch. The establishment of these needed placement resources within the Territory is considered to be a vital factor in the development of a sound child welfare program.

Improvement and development of existing welfare programs will continue in the light of increasing needs and changing socio-economic conditions in the Yukon Territory. Planning will continue to be directed towards the development of a more extensive program of preventive and rehabilitative services.

#### Review of 1970 Operations

During the year, there has been a greater demand for services placed upon the Branch than during previous years. The total caseload for all branch programs was 1,798

representing 3,489 persons; an increase over the previous year of 299 cases and 480 recipients. The increased caseload can be attributed in large part to the economic and population growth in the Yukon with its attendant influx of unemployed transients, and to a higher incidence of social problems throughout the Territory.

Welfare expenditures increased by \$235,375 over the previous year for a total expenditure of \$958,325. Based on the total yearly caseload of 1,798 cases, the average cost of all services amounted to \$532 per case. The per capita cost for the year in review was \$59.89 based on a population of 16,000.

Expenditure increases are related mainly to the major statutory programs of child welfare and social assistance and are attributable to the increased number of cases, higher rates for institutional and specialized care of children and the elderly, as well as to the ever-increasing costs of supplies and services. Another contributing factor was the first year's operating costs of a number of newly constructed welfare facilities.

The new cost-sharing agreement under the Canada Assistance Plan which was signed in December, 1969, between the Yukon Territory and the federal Department of National Health and Welfare was implemented during the year. Under this agreement the federal government reimburses the Territory fifty percent of its expenditures for welfare services and assistance to persons in need. The Canada Assistance Plan broadens federal sharing of welfare assistance to cover costs which were not shared under a previous cost-sharing agreement; such as, a) child welfare, b) health care services to welfare recipients and children-in-care, c) the costs of operating child-care facilities, and d) the added costs of improving and expanding the public assistance program, as well as the development of new social services. The agreement was retroactive to April 1, 1966, and retroactive benefits to the Yukon for the period April 1, 1966 to March 31, 1970 amounted to \$493,000.

In the family and child welfare field the branch provided services to an increased number of families and children during the year. These services included protection of children, child care, family service, adoptions, foster home finding, and services to unmarried mothers. The total of 994 cases representing 2,004 persons for the year under review reflects a considerable increase when compared with the previous year's figures of 682 cases involving 1,530 persons. This increase is an indication of the dramatic rise in the incidence of social problems and the increased demand for more family and child welfare services resulting from the rapid economic and population growth in the Yukon this past year. There were 426 children in care of the branch during the year as compared with 357 in the previous year. Total days of care provided numbered 80,318 and the average per diem maintenance cost of children in care was \$4.12.

One of the most important events in the social welfare field in the Yukon during the year in review was the enactment of a new child welfare ordinance on January 22, 1970. Previous

child welfare legislation consisted of three separate ordinances, namely: a) protection of children b) adoption, and c) children of unmarried parents. These ordinances were extensively revised, updated and consolidated into a single comprehensive piece of legislation. The new child welfare ordinance is the result of extensive research and study and represents the most progressive piece of social legislation enacted to date in the Yukon Territory.

Construction of a group home for multi-handicapped children was completed and put into operation in June, 1970. Construction of three additional child-care facilities was nearing completion as the year ended. These new homes will provide accommodation and care in a group-living setting for children in the pre-adolescent and adolescent stages. Planning is under way to convert the branch's present group home for adolescents to a receiving home and diagnostic centre.

The new 23-unit senior citizens home which was completed in December, 1969, was officially opened by Commissioner James Smith on February 6, 1970. This modern facility, which has been named the "Norman D. Macaulay Lodge" after one of the early pioneers of Whitehorse, is located in the Riverdale residential area and provides accommodation for both single and married couples. Self-contained units are provided for married couples who wish to maintain complete independence in the privacy of their suites and congregate feeding facilities are provided for occupants of the units without kitchenettes.

Construction of a new 15-bed nursing home was completed during the year and the building was officially opened by Commissioner James Smith on October 27, 1970 and named the "Alexander McDonald Lodge" in honour of one of Dawson City's well-known and most respected pioneers of the Klondike Gold Rush era. The new nursing home is staffed and operated by the Social Welfare Branch and replaces and old St. Mary's Nursing Home/Hospital which had to be closed due to its age and condition. A separate hospital facility was constructed in Dawson City by Northern Health Services and is staffed and operated by that federal government agency.

The branch's public welfare housing program is designed to build a small number of low-cost homes throughout the Territory each year for families in the poverty-stricken group. The purpose of the program is to improve the present deplorable conditions in which some of our welfare recipients live and to endeavour to reduce the high incidence of disease and social problems amongst this group of people. Since the inception of this program several years ago, ten houses have been constructed or purchased. The people accommodated in these homes consist of 12 adults and 50 dependent children — the group is made up largely of deserted wives and widows with families.

Generally, a good deal of progress has been made during 1970 in all areas of the branch's work and a high standard of service has been maintained in the administration of the total social welfare program.

#### **Plans for 1971**

Field services will be expanded and area office personnel strengthened in view of the increase in social problems in the

outlying areas and the need to provide a more extensive service to the new townsites which have been established in the Yukon as the result of mineral activity and production. Present coverage of these areas by the existing two district welfare offices is not adequate due to the vast distances involved, the infrequency of the area social workers' visits and particularly because of the rapid growth in the population which has occurred in the two areas serviced by the district offices.

It is proposed that a program of training grants and bursaries will be implemented by the branch in 1971. Training grants will be made available to Yukon students and residents to undertake an approved course of social welfare studies at a provincial technical institute, and two bursaries will be made available to university undergraduate students to undertake graduate studies in social work for their Master's degree. Each grant and bursary will carry with it a commitment of employment with the branch for a specified period of time.

In view of the need to develop more child-care resources in the northern part of the Territory to meet the increasing number of children coming into care, it is planned to establish a new children's receiving home in the northern area.

Program policies and practices will be reviewed to determine in which areas improvements and changes need to be effected in order to raise standards of service to a high level with the ultimate objectives of developing a positive and effective program of social services for the people of the Yukon Territory.

### **DEPARTMENT OF HIGHWAYS AND PUBLIC WORKS (formerly Department of Engineering)**

#### **Responsibilities**

To design, construct, improve and maintain all Territorial buildings, roads, and other public works with either own forces or under contracts. To provide engineering services and advice to all Territorial departments and to keep liaison with the appropriate Branches of Indian Affairs and Northern Development in connection with federally financed projects carried out by this Department under the "Federal-Territorial Engineering Services Agreement" and the "Remote Airports Program".

#### **Long-term Plans**

Continuation of programs improving existing roads to better geometric standards. To prepare for and to undertake surface stabilization on trunk highways. To improve design and construction standards for building projects carried out on behalf of other Territorial government departments and for use of own forces.

#### **Review of 1970 Operations**

The Yukon Road Network with the exception of the Alaska Highway and the Haines Road was maintained at a cost of approximately \$2,345,875. The mileage maintained was 1,715. A 55-ton ferry was operated on the Yukon River at Dawson City and a 36-ton cable ferry was operated on the

Pelly River at the settlement of Ross River. A skyline was operated and an icebridge constructed at Dawson City to complement the ferry during fall freeze-up, spring breakup and winter conditions to assure an uninterrupted flow of mine products from Clinton Creek, west of Dawson City, to outside markets. The MOT airports at Dawson City and Mayo and a number of Territorial flight strips were maintained.

Road reconstruction was undertaken on the Whitehorse-Keno Road between Mile 125 and Mile 142 and on the Stewart Crossing-Dawson Road between Miles 83 and 99.5. A bridge was constructed over Nares River at Carcross, providing access to mining operations south of Carcross. The bridge will also be part of the proposed road to Skagway, Alaska. The construction of an airport at Old Crow on the Porcupine River, began during the year with completion scheduled for 1971. Firebreaks were constructed around a number of Yukon communities. The Ground Improvement Program was continued, beautifying Territorial building grounds through landscaping.

Two hundred and twenty-five Territorially owned buildings were maintained.

Building construction included the completion of an addition to the Whitehorse Secondary School, completion of a school at Faro, the completion of a Territorial office building at Watson Lake, construction of new highway maintenance stations on the Boundary Road, at Drury Creek on the Campbell Highway and at Twin Creeks on the Canol Road east of Ross River, construction of houses for road crews, and construction of three welfare group homes. Also completed were the nursing home addition in Dawson City and the construction of the new nursing station, also in Dawson City.

#### Plans for 1971

Continuation of reconstructing and widening the Stewart Crossing-Dawson Road between Mile 76 to Mile 83 and Mile 104 to Mile 111 and also improving the Whitehorse-Keno Road between Mile 147 and 180. Bridge replacement is planned on the Campbell Highway. This road program is estimated to cost in the neighbourhood of 1.5 million dollars. The construction of the Old Crow airport should be completed and with the accelerated construction of the Dempster Highway, a new road maintenance camp will be constructed near the Ogilvie River. The building construction program proposed and listed by other departments will be carried out.

It is anticipated that the Alaska Highway system within the Yukon Territory will be transferred from the federal Department of Public Works to the Territorial government. This will mean an approximate doubling of size of the road maintenance establishment.

### DEPARTMENT OF LEGAL AFFAIRS

#### *Legal Adviser*

The Legal Adviser provides legal advice and service to the Commissioner, Territorial Council and other organs of government, as required.

The drafting of legislation is now almost entirely carried on in the Territory but the services of the Drafting Section of the Department of Justice are still available and made use of as the need arises.

### DEPARTMENT OF LIQUOR CONTROL

#### *Responsibilities*

The liquor department controls the importation, retailing and distribution of all alcoholic beverages within the jurisdiction of the liquor ordinance and regulations pertaining thereto.

#### *Long-term Plans*

By controlling the licensed outlets, the lodging and food establishments in the Territory can be upgraded both for the travelling public and the territorial residents. Plans also include the establishment of self-serve liquor stores in areas in the Yukon where new townsites are established, and in settlements where population increase warrants the service of a government liquor store. The department also provides a monetary base for government establishments.

#### *Review of 1970 Operations*

The past year has been a very busy period for the liquor department. In April the Mayo liquor store was converted from a conventional liquor store to a self-serve unit. The Watson Lake liquor store was moved to a new Territorial federal building and converted to a self-serve unit on October 30, 1970. It became necessary to move the liquor control offices from downtown Whitehorse to the industrial area. This was completed by September 22, and was in conjunction with the establishment of a new warehouse location in the same building. The transfer of stocks was completed and operation from the new warehouse location on December 2, 1970 was begun.

A new liquor ordinance was assented to on February 22, 1970, and enacted on April 1, 1970. One of the provisions of the ordinance was the establishment of a Yukon liquor board consisting of three members. This board has been appointed and is functioning very well. This office has been responsible for the production of papers, letters and all agenda for the meetings required. It also supplied the stenographic back-up services necessary for the operation of the board.

#### *Plans for 1971-2*

It is hoped that the new warehouse facilities will permit further streamlined operations. The next step being prepared for is the use of data processing with the use of a computer or computer time to establish sales, stock control, re-order figures and other necessary information. Plans include the installation of new liquor stores in the Faro townsite and Carmacks area if conditions indicate the necessity of these outlets.

One new position and several promotions are in process and should be finalized in the first part of the year. An amendment to the ordinance giving inspectors more power is expected to be passed by Territorial council. This will permit the upgrading of all licenced outlets through renewed inspection services.

## DEPARTMENT OF LOCAL GOVERNMENT

### *Local Government Branch*

#### Responsibilities

- Provide municipal services for all unorganized communities in the Territory.
- Assist unorganized communities to become viable municipalities as soon as economically possible.
- Maintain an advisory service and inspect existing municipalities for compliance with the provisions of the municipal ordinance.
- Develop financial assistance policies that will permit varying-sized municipalities to provide a minimum standard of service to their taxpayers.

#### Long-term Plans

- Provide a municipal procedure manual that will guide officers in smaller municipalities on standard municipal procedures.
- Establish a planning section in our Land Disposal Branch that will provide guidelines for orderly development of services such as water systems and sewage treatment plants in municipalities and organized communities and make lands available for sale.
- Formulate policy for a public housing program to provide low-income families with an acceptable standard of housing.

#### Review of 1970 operations

This branch is responsible for the administration of the Territorial low-cost housing program. During the year there were:

	1st Mortgages	2nd Mortgages
Applications received	54	17
Applications cancelled	4	8
Applications refused	7	7
Applications approved	38	2

On December 2, 1970, the Village of Faro was incorporated and the election of a mayor and three councillors was held on December 17, 1970.

With the re-organization of the Territorial government under the present executive committee structure, the name of our department was changed from Department of Municipal Affairs to Department of Local Government.

A steering committee consisting of people from the Territorial government, City of Whitehorse and surrounding areas was formed to gather information and to discuss the proposed extension of the boundaries of the City of Whitehorse.

#### Plans for 1971

- Incorporate further guidelines that will bring about closer liaisons between the Municipal Services Branch and the local improvement district bodies.
- Review the various services and service levels being provided in the communities in order to ensure that funds are being properly allocated.
- Review the present grant system for the municipalities and organized areas in the Territory.
- Rewrite municipal ordinance and local improvement district ordinance.

### *Lands & Assessment Branch*

#### Responsibilities

- The assessment of all property liable to taxation by the Territorial government
- The sale or lease of lands under the administration, management and control of the commissioner

#### Long-term Plans — Assessment

With the exception of Dawson City all of the Territory is now at the same base level of assessment. The future plans call for a more comprehensive classification and assessment of Crown-owned properties.

#### Review of 1970 — Assessment

An annual assessment of the Territory was carried out. The total taxable and grants-in-lieu assessment for the Territory excluding the Cities of Dawson and Whitehorse amounts to \$40,211,460, which includes \$14,384,800 mining property which was formerly exempt.

#### Plans for 1971 — Assessment

A general assessment of Dawson City is required this year.

An annual assessment of the Territory will be carried out this summer with more emphasis on the evaluation of Crown properties.

#### Long-term Plans — Lands

To establish a land disposal policy which will clearly define permitted uses of all available areas in the Yukon.

## Review of 1970 – Lands

Total monies received during 1970 from options/agreements for sale amounted to \$374,000. Some 227 notifications for title were issued by the commissioner, 64 of which were for Riverdale and 55 for Porter Creek.

In Porter Creek 65 trailer lots were offered for sale, all of which were sold over a three-month period.

Some 250 federal leases were turned over to the administration of the commissioner during 1970.

### Plans for 1971 – Lands

The demand for land is not expected to lessen. The supply of residential lots in both Riverdale and Porter Creek is adequate. Industrial land is available at both Porter Creek and MacRae. We will, however, have a shortage of trailer lots and provision will have to be made for additional lots for this building season. It is possible that additional federal lands will be turned over to the administration of the commissioner.

### Protective Services Branch

#### Responsibilities

To implement and administer an effective fire prevention program to reduce the loss of life and property from uncontrolled fire, as provided for under the fire prevention ordinance of the Yukon Territory.

#### Long-term Plans

- To provide organized fire departments within the Yukon Territory for every community able to staff and operate such a service.
- To train and equip all Yukon fire departments to an acceptable standard.
- To ensure conformity with the current National Building Code, National Fire Code and related standards, by reviewing plans and specifications of proposed places of public assembly.
- To disseminate fire prevention information to the general public and industry to reduce the frequency of fires in the home and places of employment.

## Review of 1970 Operations

With the provision of up-to-date training manuals, the skills and techniques of the fire services are now being continuously upgraded.

Fire inspections were made on a regular basis, resulting in a general improvement in various places of public assembly.

Fire losses in 1970 have shown a considerable decrease. Until the fire marshal's annual report is prepared with more concise figures, it is estimated the annual dollar loss has declined by \$2,400,000 as compared to 1969.

### Plans for 1971

With the addition of a fire inspector, increased emphasis will be placed on inspections of places of public assembly, training of volunteer fire departments, liaison with industry and public associations to reduce the present fire losses.

### Accommodations Services Branch

#### Responsibilities

To provide adequate accommodations for Territorial government employees where applicable under the present staff housing policy and to manage the office accommodation for the Territorial service.

#### Long-term Plans

Due to increasing responsibilities being absorbed by the Territorial government, further expansion of staff is expected; therefore, continuing expansion of appropriate accommodations for the increase of staff is anticipated.

Comprehensive studies are being carried out on future staffing requirements in Yukon communities to determine future budget requirements.

## Review of 1970 Operations

- Upgrading of and a more emphatic control of Territorial government staff accommodations.
- Placement of mobile accommodations for an accelerated teacher recruitment program throughout the Territory.
- Development of and submission of a proposed staff housing policy. The proposed policy is presently under review.

### Plans for 1971

- Further expansion of staff accommodations in Faro, Dawson City, Watson Lake and possibly Clinton Creek.
- Incorporation of the Justice Department staff and housing under Territorial government jurisdiction.
- Formulation and possibly finalization of the takeover of the Alaska Highway under Territorial government jurisdiction.

## DEPARTMENT OF TERRITORIAL SECRETARY & REGISTRAR GENERAL

The department is responsible for the following:

- Registration services:
  - Companies
  - Securities
  - Societies
  - Vital statistics
  - Business licenses
  - Co-operative associations
  - Credit unions
  - Documents registrations
  - Partnerships

- Inspection services
  - Labour standards
  - Liquor
  - Public health
  - Steam boiler
  - Watson Lake checkstation and Whitehorse weigh scales
- Motor vehicles
  - Driving program
- Workmen's compensation
- Public administrator
- Central registry
- Information Canada

The primary operations are located at headquarters in Whitehorse, with agents located at Watson Lake, Haines Junction, Mayo, Dawson City and checkpoint and weigh scale operators at Watson Lake and Mile 918 of the Alaska Highway.

#### **Long-term Plans**

The long-term plans of the department are to establish a check station at Beaver Creek and to introduce a Territorial agent to the Townsites of Faro and Watson Lake.

#### **Review of 1970 Operations**

- Under the motor vehicle ordinance, 26,036 licenses, certificates and registrations were issued.
- Under the Business Licenses Ordinance and Insurance Ordinance, 643 licenses were issued.
- Under the Bills of Sale Ordinance, Conditional Sales Ordinance, Assignment of Book Debts Ordinance, Garage-men's Lien Ordinance and Partnership Ordinance, 3,041 documents were registered.
- Under the Companies Ordinance, 75 companies became new Yukon incorporations, and 188 were licensed extra-territorially giving a total of 263 new companies.
- New securities legislation was introduced in 1970. Eighty files have been categorized into mining, industrial and investment. Companies concerned have been requested to comply with the Securities Ordinance by filing prospectuses and/or registering broker, salesmen and security issuers of the company.
- Under the Societies Ordinance, 16 new societies were incorporated.

- The public administrator opened files for 50 deceased persons and for eight insane for a total of 58. In addition to the new files, still being maintained are two files on missing persons and six files on minors.
- Under the Vital Statistics Ordinance, 422 certificates of registration of births, 108 certificates of registration of death and 198 marriages were recorded by the registrar and the Dominion Bureau of Statistics in Ottawa was notified of these Yukon statistics.

#### ● *Inspection Services*

Under the Labour Standards Ordinance, there were a total of 317 wage claims handled with an amount of \$45,395.59 collected for an average of \$143.20 per claim filed. The average number of claims handled per month was 26.4.

In addition to the above, the Inspection Branch assisted the Canada Labour Board on claims amounting to \$95,889.66 involving claims under federal jurisdiction. There were liquor inspections carried out on licensed establishments within the Territory. A total of 103 informations were laid by inspectors, broken down as follows:

62 under the Labour Standards Ordinance,  
21 under Workmen's Compensation,  
1 under Motor Vehicles Ordinance,  
10 under the Companies Ordinance,  
9 under the Business License Ordinance.

There were 351 payroll inspections carried out throughout the territory under the Labour Standards Ordinance. Twenty-one road trips were conducted to areas outside of the Whitehorse area.

#### *Watson Lake Checkstation*

The Territorial secretary oversees the operations of the Watson Lake checkstation. Three operators and a supervisor perform the assigned duties of issuing permits, assessing out-of-territory trucks for fuel oil tax and inspecting vehicles for permit and license requirements on a 24-hour basis.

#### *Whitehorse Weigh Scales*

The Territorial secretary is responsible for the operation of the newly introduced weigh scale. The station operates on a 24-hour basis weighing vehicles, checking that weight allowances have not been exceeded.

#### *Steam Boilers*

Under the Steam Boilers Ordinance, 257 inspections were conducted by a boiler inspector who was brought into the Territory.

- Recorded in the professional register were licenses issued to 2 dentists, 1 dental hygienist, 13 doctors, 12 lawyers and 4 pharmacists.

- The Territorial secretary, as Information Canada, makes available the services of various printing equipment, making it possible to handle the volume of printing required to be done by the government. Also, Information Canada is responsible for the printing of all ordinances and amendments to the ordinances of the Yukon Territory, for the printing of the votes and proceedings of the council sessions and for the publications of Gazette notices as required by certain statutes of the Yukon.
- Under the Workmen's Compensation Ordinance there were 1,529 accidents during the calendar year 1970, an increase of 437 over the same period last year. Administration of the Workmen's Compensation Ordinance was transferred from Edmonton to Whitehorse on October 1, 1970.
- The following figures show the volume of services provided by central registry and its sub-station:

New files opened	760
Files routed to the departments	43,457
Mail incoming and outgoing	321,160
Records destroyed	42.7 cu. ft.

## DEPARTMENT OF TOURISM, CONSERVATION & INFORMATION SERVICES

### *Game Branch*

#### **Responsibilities**

This branch is responsible for the administration and enforcement of the Game Ordinance, Fur Export Tax Ordinance, Migratory Bird Convention Act, Brands Ordinance and Pounds Ordinance.

#### **Long-term Plans**

**Enforcement:** In order to obtain some degree of efficiency in the enforcement of all ordinance and regulations, Game Branch expansion commenced outside the area of Whitehorse Haines Junction. Detachments are planned for Dawson City and Old Crow in the coming year and Faro as soon after as possible.

Enforcement is becoming increasingly more important with the annual increase in population and new roads into remote areas.

**Scientific:** Data collecting and scientific programs will be carried out, beginning with an inventory of the big-game animals, and related projects necessary in the proper management of wildlife.

**Miscellaneous:** The activities of trappers, guides and outfitters and hunters are to be co-ordinated to ensure the most efficient and satisfactory exploitation of these renewable resources.

## **Review of 1970 Operations**

Two Game Branch detachments were opened and staff in Watson Lake and Haines Junction, commencing the program to provide enforcement personnel in centres of population outside Whitehorse.

During the 1970 hunting season, a substantial increase in patrol work was carried out in all areas.

A total of 206 wolves were presented for bounty during the 1970 calendar year.

The 1969-70 fur harvest resulted in a total of 28,850 pelts being taken. These furs were valued at \$70,673.42 locally. This is a noticeable decrease over previous years, due mainly to the lack of trapping in the Old Crow flats area and generally lower fur prices.

Our 22 big-game outfitters accommodated 375 non-resident hunters during the 1970 hunting season. These hunters participated in 5,272 hunting days resulting in \$527,000 revenue to guides and outfitters.

"Caution" and "Warning" signs were placed in the vicinity of Mile 950 of the Alaska Highway where elk are commonly seen crossing or near the road.

Game Branch personnel accompanied other federal and Territorial employees on visits to Herschel Island and the north coast in August and September and Old Crow and Inuvik in november. Game Branch personnel also attended the 34th Federal-Provincial Wildlife Conference in July.

### **Plans for 1971**

Additional detachments are planned for Dawson City and Old Crow.

It is hoped to install a single-side band radio system in all Game Branch detachments and vehicles to work in conjunction with the Department of Engineering's present system.

An initial survey of the caribou population to the south and east of Old Crow is planned by the Canadian Wildlife Service. Game Branch personnel will assist this project.

The opening of new detachments will result in increased and more efficient patrols and closer contact with trappers and the public generally throughout the Territory.

### *Tourism and Information Services Branch*

#### **Responsibilities**

The Tourism and Information Services Branch has the responsibility of promoting travel to the Territory and encouraging the development of tourist attractions and facilities within the Territory.

In addition, the branch has undertaken the responsibility of developing information and publicity programs on all aspects of Territorial government activities as well as administering the Territorial small business loan program.

#### **Long-term Plans**

To continue to promote greater travel to the Yukon Territory and to assist in the development of the Territory's tourist and recreating facilities; to continue to expand tourist

advertising and promotion programs, particularly those aimed at the western United States; to expand the information services office until it gives complete coverage of all activities of all departments of the government.

### **Review of 1970 Operations**

The past year was highlighted by the opening, in September, of "Yukon House" in Vancouver. Yukon House is responsible for a variety of functions in the promotion of the Yukon Territory. Functioning as an extension of the Tourism and Information Services Branch, it will provide travel counselling, promotion and information programs through personal contact within the market area — primarily southern British Columbia and the western U.S.

In addition, the branch operated tourist information centres throughout the summer at Watson Lake, Beaver Creek, Haines Junction and Dawson City in the Yukon and at Prince George and Dawson Creek in British Columbia.

A second information officer, a development officer and two secretaries were added to the staff in Whitehorse and a manager and a secretary hired for Yukon House.

The branch continued its program of printing and issuing travel information brochures and also assumed responsibility for the publication of the annual report of the commissioner of the Yukon Territory.

Throughout the summer the branch was also responsible for arranging tours of various dignitaries. These included Prime Minister Trudeau, His Excellency Governor-General Roland Michener and Mrs. Michener, The Joint Senate-House of Commons Committee on the Canadian Constitution, The Science Council of Canada, and visits by various federal Cabinet ministers and their parties.

The branch, too, assisted in arranging an international Wildlife Range Conference held in Whitehorse during October.

During 1970, for the first time, the services of an advertising agency were retained to assist in placing advertisements in various Canadian and American publications. In addition, the agency undertook an extensive survey to determine the holiday habits and preferences of Yukon visitors.

During 1970, there was an increase in tourism generally in the Territory, although a slight drop was noted in the tour-package groups. This was attributed to the unsteady economic situation which prevailed throughout the tourist season in both Canada and the U.S.

Major increases were noted in highway traffic, primarily of the recreational vehicle variety. An example of this was the increase in highway travellers registering with the branch's information centres. These centres handled well over 40,000 visitors as compared to approximately 30,000 in 1969.

The Yukon's first full-length colour movie was produced during 1970 by the branch. Entitled "Yukon — Get Away Country", the film runs 13-1/2 minutes and traces a typical Canadian family as they enjoy a camping holiday in the Territory. Two hundred prints were made of "Yukon — Get

Away Country" and are now being circulated throughout Canada and the United States.

### **Plans for 1971**

- To develop displays to be entered in travel shows aimed at the prime western U.S. and Canadian market areas.
- To increase staff both in Whitehorse and at Yukon House in Vancouver.
- Improve existing tourist information centres in the Territory.
- To continue and to enlarge the current magazine advertising program.
- To continue to improve and upgrade the Territory's tourist and historic attractions.
- To further develop information and publicity programs covering all aspects of Yukon activities.

### *Library Services Branch*

#### **Responsibilities**

To provide library services to the public and to schools throughout the Yukon.

#### **Long-term Plans**

To work towards providing, as closely as possible under Territorial conditions, public and school library service at the level of accepted standards of library service.

### **Review of 1970 Operations**

With a stock of approximately 59,500 catalogued books, the Yukon regional library served 75 outlets in the various Yukon communities. There were 22,175 books shipped, on a rotating basis, to these communities. The cataloguing of 7,470 new books and added copies was completed. The members of the Whitehorse branch library borrowed 73,172 books during the year. A new branch library was opened in the community of Watson Lake. The film library distributed 5,990 16-mm films throughout the Territory and these films were viewed by a total audience of 167,476 people.

### **Plans for 1971**

A Territorial archives will be established. This program will act as the repository of permanent government records, participate in government records management, and collect, arrange and make available to researchers the public and private documents relevant to the history of the Yukon.

## **DEPARTMENT OF TREASURY**

### **Responsibilities**

- Management of the Yukon Consolidated Revenue Fund.

- Collection of all taxes and revenues.
- Supervision, control and direction of all matters relating to the financial affairs of the Territory.

#### Long-term Plans

- Introduction of advanced accounting and financial management techniques.
- Conversion of accounting systems to electronic data processing.

#### Review of 1970 Operations

Operation and maintenance expenditures for the fiscal year ending March 31, 1971 increased by \$2,286,169 or 16.8% over the previous fiscal year. This increase is primarily attributable to higher student enrolment in the education system and increased costs under the health and welfare statutory programs.

The revenues, recoveries and operating deficit grant related to operation and maintenance increased for the fiscal year by \$1,764,725 or 11.4%. Increases in this area resulted from normal volume increases, higher expenditures in the cost shared programs and an increased operating deficit grant.

The overall financial position for operation and maintenance resulted in a surplus of \$834,907 for the fiscal year under review.

#### Project and Loan Capital

Capital and loan expenditures for the fiscal year ending March 31, 1971 amounted to \$8,889,870, of which \$3,339,353 was funded through cost-sharing agreements with the balance being funded by way of loans from Canada.

The overall position for capital and loan resulted in a surplus of \$945,379 which will be used to complete projects under construction at year end.

In general terms the year ending March 31, 1970 was one in which, financially, the department was left in a favourable position. However, it would appear from preliminary results that the 1970/71 fiscal year will more than offset the previous year's surplus. This anticipated deficit results from increased payments under statutory programs such as education, health and welfare.

#### Plans for 1971

Departmental planning includes a reorganization of the department and continued improvements to the accounting system.

## MINISTRY OF TRANSPORT

### AIR SERVICES

#### *Airports & Field Operations Branch*

##### Responsibilities

To operate and maintain airports in the North owned by the Ministry of Transport.

##### Long-term Plans

To anticipate and provide for the future needs of airports and field operations in the North, consistent with the growth of aviation and northern development.

#### Review of 1970 Operations

##### Baker Lake, N.W.T.

- Supply of rations for M.O.T. employees ceased April 1, 1970, in accordance with Treasury Board directives. Mess hall opened during summer months on a temporary basis.
- Approximately \$33,500 spent on runway improvements.

##### Cambridge Bay, N.W.T.

- Commenced installation of site fire alarm system.
- Commenced construction of double dwelling and re-roofing of existing buildings.

##### Coppermine, N.W.T.

- Commenced renovations to single men's living quarters.

##### Coral Harbour, N.W.T.

- Plumbing facilities installed in mess and living quarters.

##### Ft. Good Hope, N.W.T.

- Power house converted to garage.

##### Ft. Reliance, N.W.T.

- Standard operation and maintenance.

##### Ft. Simpson, N.W.T.

- Extension to air terminal building.
- New taxi strip and apron built.
- New airport entrance road built.

##### Frobisher, N.W.T.

- Building T. 66 modified

##### Hay River, N.W.T.

- Field electrical centre installed.
- Water system up-graded.

##### Inuvik N.W.T.

- Commenced re-roofing of buildings.
- High-intensity runway lighting

##### Norman Wells, N.W.T.

- New Utilidor system installed.

##### Rankin Inlet, N.W.T.

- Ministry of Transport assumed responsibility for operation of the airport Sept. 1, 1970.
- Medium-intensity lighting installed.

##### Resolute, N.W.T.

- Construction of crosswind runway continued.
- Scale of operations higher than preceding year.

##### Yellowknife, N.W.T.

- Installation of high-intensity runway and approach lighting.

##### Whitehorse, Y.T.

- Construction commenced on new operations building including control tower.

**Plans for 1971****Baker Lake, N.W.T.**

- Anticipated expenditure of \$60,000 on runway improvements.

**Cambridge Bay, N.W.T.**

- Complete installation of fire alarm system.

- Complete construction of double dwelling.

- Installation of VASIS.

- Stabilize runway

**Coppermine, N.W.T.**

- Complete renovations to single men's living quarters.

- Build road and install culverts.

**Ft. Reliance, N.W.T.**

- Replacement of power house.

**Ft. Simpson, N.W.T.**

- Installation of new taxi and runway lighting.

- Construct 2-bay garage.

**Hay River, N.W.T.**

- High-intensity approach lighting to be installed.

- New fire alarm system to be installed.

- New emergency power unit to be installed.

**Inuvik, N.W.T.**

- Re-roofing of buildings to be completed.

- New emergency power unit to be installed.

- New control tower to be built.

- New fire alarm system to be installed.

**Rankin Inlet, N.W.T.**

- Runway improvements to be carried out.

**Resolute, N.W.T.**

- Crosswind runway to be completed.

- Medium-intensity runway lighting to be installed.

- Power plant to be expanded.

- Field lighting cables and transformers to be replaced.

**Yellowknife, N.W.T.**

- Installation of new fire alarm system.

**Whitehorse, Y.T.**

- Construction of new operations building and tower to be completed.

## CANADIAN SURFACE TRANSPORTATION ADMINISTRATION

During the year 1968-70, the newly formed Canadian Surface Transportation Administration had no direct or formal program responsibilities in the North.

However, the role of CSTA during this period did involve the application of policy, particularly in the form of inter-departmental co-ordination with a major emphasis on the northwest highway system. The policy in this and other areas with respect to highways is under review, but the general form is to ensure that all highways are considered as links in the greater national system. Accordingly, the policy for one highway would be the same as for all others, unless special circumstances indicated a variation. This is reflected in the refusal to permit a more widespread use of heavier vehicle loadings on the Alaska Highway.

A major review of railway transport facilities in the Northwest started during this period. In November, 1970, the consulting firm of Hedlin Menzies & Associates submitted their final report on the economics of constructing a rail line to link the Yukon with the continental rail network. Five major rail routes were studied originating at various points in Northern British Columbia and following several routes to Dawson City in the Yukon. This review is nearing completion.

## CIVIL AVIATION BRANCH

### 1. *Development of Airways and Air Routes*

During 1970, no additional airways or air routes, other than company routes, were established in the North. It is anticipated, however, that further air routes will be established after the installation of a new non-directional beacon at Fort Reliance, now underway.

### 2. *Coppermine, N.W.T.*

As part of the joint DIAND/MOT programme for the development of airstrips in the far North, the amount of \$31,368.00 in MOT funds was expended for airport development at Coppermine during 1970.

### 3. *Completed Projects in 1970*

Location	Project	Total Cost
a) Rankin Inlet	Medium Intensity Runway Lighting	\$ 40,000.00
b) Hay River	Instrument Landing System	\$231,100.00

c) Inuvik	Abbreviated VASIS	\$ 25,200.00
d) Inuvik	Glide Path and Middle Marker	\$ 98,800.00
e) Norman Wells	Abbreviated VASIS	\$ 28,000.00
f) Yellowknife	Abbreviated VASIS	\$ 24,500.00
g) Yellowknife	Low Intensity Approach	\$ 11,800.00

#### 4. Projects Commenced in 1970

Location	Project	Total Cost	Deg. of Completion
a) Frobisher Bay	VASIS	\$56,000.00	10% completed
b) Frobisher Bay	VHF Omni Range	93,700.00	90% completed
c) Baker Lake	Upgrade Runway (commenced 1969)	185,000.00	27% completed
d) Resolute Bay	2nd runway (commenced 1969)	314,700.00	68% completed
e) Resolute Bay	Medium Intensity Approach Lighting	31,500.00	56% completed
f) Fort Reliance	Non-Directional Beacon	90,500.00	6% completed
g) Fort Smith	Outer Marker Non-Directional Beacon	35,800.00	97% completed
g) Fort Simpson	Taxiway & Ramp	19,000.00	83% completed
i) Inuvik	Runway & Approach Lighting	180,000.00	62% completed
j) Yellowknife	Runway & Approach Lighting	187,400.00	99% completed

#### Air Traffic Control

Construction of Whitehorse control tower commenced in July of 1970 for completion in 1971-72 fiscal year. ATC Interphone circuits from Edmonton to Cambridge Bay and Anchorage, Alaska were upgraded by the addition of a dial select capability.

### MARINE OPERATIONS BRANCH

#### Responsibilities

To carry out and co-ordinate the delivery of cargo and passengers for Canadian Government, U.S.A.F. and commercial concerns; icebreaking and escorting where required and also to conduct scientific work such as oceanographic and hydrographic surveys and to arrange and provide for stevedoring services at Goose Bay.

#### Long-term Plans:

To continue to improve Marine work in the North and to plan to meet any anticipated resupply or requirements in the future.

#### Review of the 1970 Operations

The Ministry arranged for and provided 11 Coast Guard vessels, 4 dry cargo vessels, 7 oil tankers and 10 other commercial vessels which carried cargo on a rate-per-ton basis.

Approximately 127,000 short tons of general cargo and bulk oil were transported and handled in the Arctic in 1970. A breakdown of the tonnage handled by the various vessels is provided with this report.

#### Eastern Arctic

The resupply of Resolute Bay and the Joint Arctic Weather Stations was carried out by using two dry cargo vessels and two tankers: *MV Cabatarn*, making two trips, and *MV Imperial Acadia*, making one trip, supported by icebreakers. The resupply of Eureka and sites further North was accomplished by CCGS *John A. Macdonald*. The *MV Chesley A. Crosbie* and *MV Edouard Simard*, a commercial dry cargo vessel and a tanker, carried supplies to the vicinity of Eureka for Panarctic Oils Limited and were escorted inward and outward by the CCGS *John A. Macdonald*.

The CCGS *N. B. McLean* and CCGS *Sir Humphrey Gilbert* provided assistance to vessels in the Hudson Bay area for exploration work on behalf of the Aquitaine Company.

Oceanographic and hydrographic assistance in various areas of the Eastern Arctic, was also provided to the Department of Energy, Mines and Resources.

A further trial was conducted using the Sikorsky Skycrane, for the movement of supplies from ship to shore. A special vessel, *MV Fort St. Louis*, was chartered to carry supplies to five ports in the Arctic and this method of operation proved most successful. The economics of the operation for future use are being studied.

The CCGS *Louis St-Laurent* made a late voyage in December to Churchill, Manitoba, to commemorate the Manitoba Centennial Year. She reached the Harbour of Churchill without much difficulty but was unable to berth because of ice alongside the pier.

#### Western Arctic

The arrival of the CCGS *Camsell* in the Western Arctic was delayed because of the need to escort vessels around Point Barrow and east to Mackenzie Bay. Experience has shown that ships not protected or strengthened for ice should not attempt the passage around Point Barrow until August, and then only when the polar ice has been driven off the coast by off-shore winds. The icebreaker, while passing through ice, churns up large pieces in its wake, which in turn could cause damage to unprotected hulls, rudders and propellers.

Due to heavy ice, all the vessels were left south of Point Barrow and only the hydrographic vessel *Parizeu* accompanied the *Camsell* into the Western Arctic.

After reaching Canadian Arctic waters very little ice was encountered and only limited icebreaker assistance was required. The *Camsell* remained in the area until after September 10th when the *Frank Broderick* was clear of Queen Maud Gulf and the NTCL released the *Camsell* from further escort service.

### Plans for 1971

It is expected that the 1971 season will be similar to last year and plans are being made accordingly. It is possible that additional assistance by icebreakers will be required for scientific groups and exploration companies. The servicing of aids to navigation in Hudson Bay and Strait will be carried out and icebreaker assistance in conjunction with the Arctic resupply operation will be provided.

### *Hay River Marine Agency*

#### Responsibilities

The geographical area of administrative responsibility of the Hay River Marine Agency is east of the B.C./Alberta border to the Saskatchewan/Manitoba border and north of a line drawn east and west through Edmonton including all the Northwest Territories as far east as the Boothia Peninsula.

The District Manager represents the Marine Services of the Ministry on Marine matters pertaining to the district defined above, which encompasses the northern coastline of the Northwest Territories and all the navigable, minor and inland waters of the Northwest Territories and Alberta, north of Edmonton. The Agency staff directs and administers activities pertaining to the construction, operation and maintenance of aids to navigation, and the operation of five Coast Guard ships, the administration and maintenance of government wharves, public harbours, and search and rescue activities by the vessels. The Shipping Master & Receiver of Wrecks represents the Ministry in matters pertaining to the Navigable Waters Protection Act.

#### Long-term Plans:

The long term plans of the Agency are primarily that of maintaining the present standard of providing aids to mariners and of assisting in rescue operations when required. To perform the aforementioned functions will mean a constant program of updating aids in keeping with improved technology and the utilization of different modes of transportation when they have been proved effective, such as helicopters, hovercraft, etc. Since the North is going through a constant cycle of change, especially in the past three to four years, it is felt that to keep abreast, the Agency must be flexible and adaptable.

#### Review of the 1970 Operations

During the past year the Hay River Marine Agency maintained and serviced more than 2,000 aids to navigation including lights, buoys, fog alarms, etc. A large portion of the year's operation was spent in routine maintenance and updating of the aforementioned equipment.

The Agency had the unique distinction of entertaining the Royal Family of the CCGS *Eckaloo* and *Tembah*. The Royal Family was hosted to an informal luncheon and given a short tour of the Mackenzie River during this visit to the Territoires in July.

With the constant need to improve aids to navigation, the Hay River Marine Agency, during 1969, installed a pilot responder beacon at the entrance to Tuktoyaktuk Harbour;

although the installation was done quite late in the season, the Agency was able to assess this as being a very vital piece of navigational equipment. Based on these findings, the Agency procured and installed during the 1970 season three additional responder units. They are regarded by mariners as vital piece of navigational equipment and are invaluable in the low-lying terrain on the Mackenzie Delta.

Flight permits were issued by Marine Services Regulations Branch for two air cushion vehicles which operated in the Mackenzie area during the summer and fall of 1970. A 10-passenger air cushion vehicle was used on a trial basis four miles south of Tuktoyaktuk to determine whether or not terrain damage would result. An inspection of the area some time after the trials revealed that no significant damage to the tundra had occurred although the vehicle had operated 50 times over the same route.

Apart from the routine maintenance and servicing of aids to navigation, the Agency was able to develop more fully the technique of helicopter support. The conclusion is that helicopters are reliable, efficient, and a fast mode of maintaining and servicing certain aids to navigation in the Mackenzie River area.

### Plans for 1971

The plans for 1971 include the added responsibility for all aids to navigation in the Western Arctic as far east as the Boothia Peninsula. The actual servicing of the aids will be carried out by the CCGS *Camsell* of the Victoria Marine Services Agency.

### *Victoria Marine Services Agency*

#### Responsibilities

The Victoria Marine Services Agency is responsible for establishing and servicing aids to navigation in the Western Arctic. They also carry out track sounding and other hydrographic work, required search and rescue missions and special assignments assisting research and development projects in the Western Arctic.

#### Long-term Plans

Long term plans consist of maintaining the present standards of marine aids to navigation and providing new aids as required. This includes the standard program of updating aids to navigation in keeping with improved technology.

#### Review of the 1970 Operations

The following aids to navigation work was carried out during the 1970 season:

#### New Aids Established During 1970

Leader Island	— Millard Tower radar beacon established
Seal Island	— Millard Tower radar beacon established
Baillie Island	— Millard Tower radar beacon established
Coppermine	— Two additional buoys installed.

### Improvements to Aids Made in 1970

Coppermine	— 6 single drum buoys were replaced with wooden spar buoys to better withstand the ice.
Cambridge Bay	— Buoy No. 7 — Green reflector installed
Cambridge Bay	— Buoy No. 2 relocated.
Simpson Strait	— Buoys Nos. 9, 10, 15, 17 and 18 relocated.
Gjoa Haven	— Rear range beacon rebuilt.
Tulloch Point	— Rear range beacon rebuilt.

### Plans for 1971

The Agency proposes to continue the maintenance of existing aids to navigation in the Western Arctic, including the placing of the buoys at Tuktoyaktuk, Coppermine, Cambridge Bay, Simpson Strait and Spence Bay.

The establishment of transponder radar beacons at strategic locations will probably be the most beneficial type of aid to navigation to be installed. With this in mind, it is proposed to install a transponder radar beacon at Whale Bluff during the summer of 1971.

The maintenance, servicing and installation of aids to navigation in the Western Arctic will, commencing with the 1971 season, be transferred from the CCGS *Camsell* to the CCGS *Skidegate* which operates under the direction of the District Manager, Hay River Marine Agency.

### Quebec Marine Agency

#### Responsibilities

The Quebec Marine Agency is responsible for establishing and servicing aids to navigation in the Eastern Arctic, including Foxe Basin, Foxe Channel and Hudson Strait. The Agency carries out required Search and Rescue missions and other special assignments assisting Research and Development projects in the Eastern Arctic.

#### Long-term Plans

Long term plans consist of maintaining present standards of Marine aids to navigation and providing new aids as required. Included in the programme is the continual updating of aids to navigation in keeping with improved technology.

### Review of the 1970 Operations

There were no new aids to navigation established in the Eastern Arctic in 1970. Existing aids to navigation are categorized below and these were serviced as required:

Coast Radio Stations & Radio Beacons	— 18
Lights	— 16
Radar Reflector Towers	— 46
Unlighted Marks	— 40
Buoys	— 3

### Plans for 1971

Studies are now in progress to determine the future aids to navigation requirements in the Eastern Arctic. A good portion of this work was done in the early fall of 1970 in preparation for the Arctic Conference at Yellowknife in December, 1970.

The Agency will provide sufficient aids to keep pace with the development of Arctic resources and any new shipping modes which may emerge.

It is anticipated that world-wide electronic systems available in the North will be used by Coast Guard and National Defence vessels. Commercial vessels will be urged to equip their ships so they may also make use of these electronic systems.

### METEOROLOGICAL BRANCH

#### Responsibilities

Provision of meteorological facilities and services to meet approved requirements; research necessary to support these services and to increase understanding of the weather processes and climate of northern Canada; obtainment of meteorological reports from ships in northern waters; ice reconnaissance; the provision of weather forecasts and weather advisory service; ice forecasting and ice advisory service for the navigable waters of the North. Operation of twelve upper-air stations in the North and, jointly with the United States Weather Bureau, operation of the Joint Arctic Weather Stations in the Queen Elizabeth Islands at Resolute, Alert, Eureka, Isachsen, and Mould Bay, including maintenance and development of the supporting airstrips at the last four of these stations, and operation of telecommunications facilities, in support of the meteorological program, at these four stations.

#### Long-term Plans

To provide more complete meteorological and related scientific information in the North, necessitating an expanded network of surface weather-observing stations and improved equipment for upper air observations to higher levels; to provide forecasting services as needed for expanding activities in the North; to provide more married living accommodation at several locations in order to encourage more experienced personnel to serve at these stations; to operate seismic vaults for the Department of Energy, Mines and Resources at a few locations, and to undertake a program of ozone, water vapour, and radiation observations to high levels in the atmosphere at certain stations.

### Review of 1970 Operations

The following stations were added to the Synoptic and Hourly Weather Network: Drake Point, N.W.T., Hecla, N.W.T., Hoodoo, N.W.T., Satellite Bay, N.W.T., Towson Point, N.W.T., Cape Norem, N.W.T. and Cape Dorset, N.W.T. Observations at

Cape Dorset are taken by four Eskimos of the West Baffin Co-operative under service contract with CMS. Two stations terminated operations, namely Rowley Island, N.W.T. and Nottingham Island, N.W.T. At the close of 1970, there were 22 CMS observing stations, 14 stations with observations taken by MOT Telecommunications Branch, 11 Dewline stations making observations and 16 co-operative and contract stations, for a network total of 63 surface weather stations.

The Polar Continental Shelf Project completed its third year for detailed weather observations at four locations on Meighen Island. This project again received aid from CMS in the form of instruments and equipment. The PCSP also operates a surface weather program from its base at Tuktoyaktuk, N.W.T. (identifier TW), during the summer months.

The Snow Survey Network was decreased by two stations to 26. One station was added to the Noctilucent Cloud Network bringing the total number to 17. Five stations continued participating in a joint project with the Radiation Protection Division of the Department of National Health and Welfare, collecting radioactive fallout samples.

There were 10 autographic rain recorders and 18 wind recorders in operation north of 60°N. Evaporation studies remained unchanged with six stations. At 18 stations, the Sunshine Recording Network was increased by two. Twelve stations have recording radiation detectors. Soil temperatures were taken at five sites.

Fifty-nine stations completed break-up and freeze-up reports on 53 fresh water bodies and 38 salt water bodies.

Eighty percent of the surface weather stations were visited by Meteorological Inspectors in 1970.

The upper-air stations maintained their full program of two rawinsonde ascents per day sending instruments to heights averaging over 90,000 ft. to measure and transmit temperature, pressure, and relative humidity data throughout the ascents. These instruments were also tracked to determine the upper winds at the various levels. Significant progress was made in the effort to achieve higher levels in upper-air and upper wind observations.

A new upper-air station was constructed at Cambridge Bay and the upper-air observing program was transferred from Coppermine to Cambridge Bay in February, 1970. The upper-air observations were discontinued permanently at Clyde River in August, 1970 when it became apparent that it would be uneconomical to maintain this station any longer. Seismic observations were carried out at three seismological observing stations in conjunction with meteorological observations at Coppermine, Frobisher and Inuvik.

The Arctic weather office at Edmonton provided forecasts for various activities in the Arctic. The increased activity on land, on water and in the air necessitated an expansion in these forecast services, and in many cases routine daily issues were substituted for the previous "on request" programs. Forecasts were also provided for the Yukon, Baffin Island and the southern part of the Northwest Territories by weather offices at Whitehorse, Winnipeg, Goose Bay and Frobisher.

The central analysis office in Montreal routinely issued forecasts for high-altitude aviation for areas extending from the Canada-U.S. border to the North Pole. These forecasts were distributed throughout Canada, and internationally, by facsimile.

The Ice Central in Halifax issued seasonal ice outlooks, thirty-day ice forecasts, and short-range ice forecasts for Arctic and sub-Arctic waters. The forecasts in chart form were broadcast from Edmonton by radio facsimile for use by shipping in Arctic waters. In addition charts of recent ice observations were broadcast by radio facsimile from Frobisher.

As a result of the rapidly increasing aviation activity in the Northwestern Arctic, the meteorological station at Inuvik was upgraded to a weather office with staff trained to provide a "briefing and presentation" service to the large number of local and long-distance aircraft flights. Additional staff were similarly provided at Resolute during the summer season to render weather briefing and presentation service for the increased traffic at that airport.

During 1970, a total of 208 flights were flown by chartered ice reconnaissance DC-4 aircraft north of sixty degrees north and 28 flights by the chartered DC-3 aircraft in the Western Arctic for the period April to the middle of December, 1970. This included ice reconnaissance for two special projects, the second tanker trial of SS *Manhattan* in company with CCGS *Louis S. St. Laurent* in the Davis Strait-Baffin Bay area in April and May and "Operation Churchill" in the Hudson Bay route during November and December, 1970.

Ice observers were also regularly assigned to CANFORC Arctic surveillance flights twice a month from June to December, 1970 resulting in a significant increase of data acquired especially in the Labrador Sea, Davis Strait and Baffin Bay areas.

Ice observers were assigned from July to October, 1970 to Canadian Coast Guard icebreakers in the Arctic as requested by the director of Marine Operations Branch. An ice observer embarked on the SS *Manhattan* for the second Arctic tanker trial at Newport News on April 1, 1970 and performed the functions of a weather and ice coordinator for the entire voyage ending June 9, 1970 at St. John's. Two ice observers were assigned to CCGS *Louis S. St. Laurent* during this period and carried out a full weather-and ice-observing program during this successful transit.

A continuing experimental program of research and development in acquiring and interpreting airborne and remote sensing data was carried out using both Charter DC-4 aircraft. Results are now being assessed.

A joint project in September was conducted in Norwegian Bay over a test strip of several types of sea ice. The Defence Research Board, Marine Operations Branch, Telecommunications and Electronics Branch and the Canadian Meteorological Service were involved in this activity. One of the chartered DC-4 aircraft was equipped with a Bendix thermal mapper and a panoramic camera while the other had a line scanner, produced by Computing Devices of Canada, installed. The ground party was provided by the Defence Research

Board. Transportation from the CCGS *John A. Macdonald* to the ground truth site was provided by the Marine Branch. Several sorties were flown by both aircraft, some of them simultaneously over the test area and preliminary results indicate that the tests were generally quite successful.

Thirty-seven selected stations provided daily "Shore Ice Reports" during the navigation season and 28 sites provide weekly ice thickness reports throughout the winter for the Arctic area. An "Ice thickness data for selected Canadian stations freeze-up 1968 — break-up 1969" publication was compiled and distributed and three "Ice Observation" series for Canadian Inland Waterways, 1968; Canadian Arctic, 1968 and the Hudson Bay Route have recently been submitted to the printer. It is anticipated that with a new Xerox reduction process the backlog of data requiring publication will be substantially reduced.

The Arctic weather stations at Resolute, Alert, Eureka, Isachsen and Mould Bay continued to be operated jointly by the Canadian Meteorological Service. However, in a planned program of United States withdrawal from the joint operation of these stations by October 1972, Alert became the first fully Canadian-operated station November 26, 1970 when the last U.S. meteorological technician departed. One U.S. staff member was also replaced by a Canadian at Eureka in November and one at Resolute in April.

In addition to the regular surface synoptic and upper-air observations; the following programs were also carried out:

- hourly surface weather, total ozone and ozonesonde observations, soil temperature, noctilucent clouds, evaporation rates, radioactive fallout — all at Resolute only;
- solar and net radiation measurements — Resolute, Mould Bay and Alert, Eureka and Isachsen (the latter two added to the network in August) plus sky and reflected radiation measurements at Resolute;
- auroral observations — Resolute, Alert, Isachsen, Mould Bay;
- sunshine record, snow survey, and growth of sea ice — all stations;
- at Alert, the meteorological technicians operate the super-neutron monitor for Atomic Energy of Canada. Seismological observations at Mould Bay, Alert and Resolute are carried out by Department of Energy and Mines Resources Earth Physics Branch personnel.

GMD test antenna at each JAWS was replaced or relocated in order to improve the accuracy of the observations.

Old and worn-out jet-type heaters (many of early U.S. vintage) were replaced at three stations by standardized Canadian-type heaters. Replacements for the fourth station are scheduled for 1971.

Commercial airlift was used in support of Isachsen, Eureka and Mould Bay, while supporting airlift for Alert was provided by Canadian Forces and commercial airlift.

### Plans for 1971

At the Joint Arctic Weather Stations the following is planned:

- progress in the program of take-over of operational responsibilities from the United States National Weather Service at Mould Bay and Isachsen;
- continuation of a program of improvement in electrical systems, garage facilities and water storage at Eureka and Isachsen.

Current plans provide for the expansion of the surface observing network by the establishment of two stations in the Yukon Territory and one station in Northern Quebec to be operated by service contract arrangements.

No expansion is planned in the upper-air network for 1971. The increase in air traffic at Inuvik makes it necessary, however, to relocate the upper-air station and preliminary work is being planned to find and prepare a new site.

It can be anticipated that the current level of operations will be maintained, although plans are not yet finalized as to a suitable type of platform for aerial ice surveillance. Active investigations are under way on appropriate sensors for ice reconnaissance work and efforts are continuing to update current experience by closely following progress in this new field in other countries.

## TELECOMMUNICATIONS & ELECTRONICS BRANCH

### Responsibilities

To provide radio aids to air and marine navigation; to provide radio facilities for various scientific organizations and for meteorological observations; to provide other telecommunication facilities as required.

### Long-term Plans

To expand operations in response to increasing demand; the further development of telecommunications facilities for the transmission and reception of voice and record traffic to additional stations, this involves the administration of services for government needs, and may include public needs as well.

### Review of 1970 Operations

#### Arctic

Radar transponder beacons operating in the 9300-9500 MHz band with a range of approximately 20 miles were commissioned at Tuktoyaktuk, Pullen Island and North Peak, N.W.T.

Omega monitoring equipment has been installed in the Northwest Territories at Coral Harbour, Frobisher Bay and Resolute. At Frobisher Bay and Resolute, atomic frequency standards were incorporated in the equipment to provide a stable source of reference. Equipment for this project has been supplied by M.O.T., EM&R (PCSP), U.S. Naval Laboratories Centre, San Diego, California and U.S. Naval Research Laboratory, Washington, D.C. Partial reduction of data will be done in Ottawa with the final processing done by the participating U.S. organizations. The processed data will then be used to aid in the studies of Omega signal propagation in Arctic regions. The results of these studies will provide improvements in the proposed Sky-Wave Correction Tables. Thus, a more accurate navigation in Arctic regions for both marine and aeronautical uses will be furthered.

#### **Belle Isle and St. Anthony, Nfld.**

After operation by the former Department of Transport since 1925, the marine radio station on Belle Isle was closed on October 15, 1970, and replaced by a new station at St. Anthony, Nfld. Relocation to a more accessible point has made it possible to improve services and has also simplified staffing through relocation to an organized community having regular medical, hospital and mail services.

#### **Chibougamau, P.Q.**

A radiobeacon (NDB) was placed in service.

#### **Footner Lake, Alta.**

The aeradio station formerly at High Level, Alta. was relocated by several miles and the name changed to Footner Lake Aeradio.

#### **Fort Good Hope, N.W.T.**

Air-ground communications facilities were expanded by the addition of two new VHF frequencies at the aeradio station.

#### **Fort McMurray, Alta.**

An Instrument Landing System (ILS) was placed in service.

#### **Fort St. John, B.C.**

Direct Pilot-Controller (DCPC) VHF communications facilities controlled from the Area Control Centre (ACC) at Edmonton were placed in service.

#### **Frobisher, N.W.T.**

An HF ship-shore marine telephone and message service was established on 4409.4/4410.8 kHz (Channel 81).

Telex was installed at Frobisher marine/aeradio station.

#### **Goose Bay, Lab.**

A marine telephone service was commissioned on the medium and high frequencies (Channels 59 and 81) assigned to this station.

#### **Grande Prairie, Alta.**

A VHF omni-directional range (VOR) was placed in service.

The former low-frequency radio range (LFR) was converted to a radiobeacon (NDB).

#### **Great Slave Lake, N.W.T.**

Marine radiobeacons, operating in the 285/325 kHz band, were commissioned on Hardisty Island, Slave Point and Pilot Island in Great Slave Lake.

#### **Hopedale, Lab.**

The Hopedale marine radio station was changed from an independently operated and staffed station to an unattended extended-range station operated by remote control from the Goose Bay marine/aeradio station, resulting in substantial savings to the Ministry.

#### **Inoucdjouac, P.Q.**

A radiobeacon (NDB) which has been operating "on test" was officially commissioned.

#### **La Ronge, Sask.**

An air-ground peripheral facility controlled from the aeradio station at Prince Albert was placed in service.

#### **Resolute, N.W.T.**

In support of the second voyage of the S.S. *Manhattan* in the spring and Arctic resupply operations during the summer and fall, a ship-shore radioteletype service was provided to the CCGS *Louis S. St. Laurent* and *John A. MacDonald* by Resolute marine/aeradio for expeditions handling of marine services operational traffic.

#### **Resolution I., N.W.T.**

An HF ship-shore radiotelephone message service was established on 4409.4/4410.8 kHz (Channel 81).

#### **Sachs Harbour, N.W.T.**

The aeradio station which operated on an "on request" basis was placed on 24-hour operation.

#### **Saglek, Nfld.**

Several VHF/UHF air-ground facilities formerly operated locally by the USAF were taken over by MOT and are now controlled from Goose Bay.

#### **The Pas, Man.**

A VHF omni-directional range (VOR) was placed in service.

#### **Thompson, Man.**

An Instrument Landing System (ILS) was placed in service.

#### **Wabush, Nfld.**

A VHF omni-directional range (VOR) was placed in service.

#### **Yellowknife, N.W.T.**

An Instrument Landing System (ILS) was placed in service.

**Point-to-Point Communications in the North**

Radiotelegraph circuits at Schefferville, Nitchequon, Fort Chimo, Border and Lake Eon in the province of Quebec were replaced by radioteletype. Radioteletype was installed also at Poste-de-la-Baleine, P.Q. and Inoucdjouac, P.Q., linking these two stations to Churchill, Man. These teletype operations are supported by single-sideband radiotelephone facilities.

During December 1970, the Telecommunications and Electronics Branch, Ministry of Transport, put into operation a fully computerized communications system. Consequently, greater economies are being realized and it is significant to note that there has been a considerable decrease in the transit time of aeronautical operational and administrative communications to and from all related locations, including those of the Yukon and Northwest Territories such as Whitehorse, Inuvik, Cambridge Bay and Frobisher Bay.

**Plans for 1971**

VHF omni-directional ranges (VOR) are being installed at Frobisher, N.W.T.; Churchill, Man.; and Thompson, Man. and are expected to be commissioned early in 1971.

An Instrument Landing System will be commissioned at Hay River early in 1971.

VHF omni-directional ranges (VOR) are planned for Fort Chimo, P.Q., Schefferville, P.Q., and Whitehorse, N.W.T. Equipment is expected to be delivered to these sites late in 1971.

Direct Pilot-Controller (DPDC) VHF communications facilities installed at Fort Nelson, B.C. and controlled from the Edmonton Area Control Centre will be commissioned early in 1971.

**Cape Hopes Advance, N.W.T.**

It is planned to close the marine radio station at this location. The non-directional radiobeacon facility will be relocated to Koartac, N.W.T. A limited ship-shore safety communications service for the southern portion of Ungava Bay will be provided from the Fort Chimo station on 2182 and the 2582/2206 kHz channels.

**Frobisher Bay, N.W.T.**

Install Distance Measuring Equipment (DME) on ILS 36, December, 1971.

**Fort Reliance, N.W.T.**

Establish a 3 KW NDB in 1971-72.

**Fort Smith, N.W.T.**

Establish an outer marker for ILS in 1971-72.

**Goose Bay, Lab.**

It is planned to commission a VHF ship-shore marine telephone and message service at this station.

**Hay River, N.W.T.**

ILS runway 30 partially installed. To be completed July, 1971.

**Inuvik, N.W.T.**

Telecommunications equipment for the new tower and ICAO air/ground equipment to be provided in 1971-72.

**Mackenzie River System**

Efforts will continue to effect further improvements in ship-shore communications on the Mackenzie River system. It is expected that single-sideband equipment will be made available for installation on all CCG vessels on the system in 1971-72.

**Teslin, Y.T.**

The LFR will be replaced with a 500W, solid-state NDB in 1971-72.

**Whitehorse, Y.T.**

A VHF/DF is scheduled for installation in October, 1971, and a VOR is to be established in December, 1971.

**Wrigley, N.W.T.**

Plans are made to relocate all Aeradio equipment to the new Operations Building in 1971-72.

**Yellowknife, N.W.T.**

A radio-teletype system will be installed connecting Yellowknife with Fort Reliance in 1971-72.

## NATIONAL MUSEUMS OF CANADA

### NATIONAL MUSEUM OF MAN

#### *Archaeology Division*

##### **Responsibilities**

To conduct archaeological research designed to elucidate the prehistory of the native peoples of Canada; this includes research in the Yukon and Northwest Territories. Also to make this information available to the public.

##### **Long-term Plans**

To locate and excavate archaeological sites in the Yukon and N.W.T., and to compile and analyse the information recovered so as to trace the origins and development of the native cultures of the north. Also to co-operate with other federal or territorial agencies concerned with the dissemination of this information.

#### **Review of 1970 Operations**

Four officers of the Archaeology Division conducted research activities in the north:

- Dr. R. Morlan investigated sites in the Old Crow Flats area, Yukon Territory.
- Dr. J. V. Wright did an archaeological survey in the Back River region, District of Keewatin.
- Dr. D. Clark did an archaeological survey of the Colville Lake – Anderson River region, District of Mackenzie.
- Dr. R. McGhee investigated sites near Tuktoyaktuk, District of Mackenzie.

Three university students working under contract with the Archaeology Division conducted research activities in the North:

- Miss G. Fedirchuk, University of Calgary, investigated sites near Ft. Liard, District of Mackenzie.

- Mr. B. Gordon, University of Calgary, undertook salvage of archaeological sites threatened by oil survey activity in the Mackenzie delta, District of Mackenzie.
- Mr. G. Wensel, University of Manitoba, did an archaeological survey in the Chesterfield Inlet region, District of Keewatin.

Members of the Archaeology Division worked in co-operation with the N.W.T. Historical Advisory Board in connection with the drafting of a N.W.T. ordinance relating to historic sites, museums and archives, the compilation of a N.W.T. archaeological site file, and the assessment of archaeological sites in terms of possible tourism potential.

##### **Plans for 1971**

Activities in the north have not yet been planned, but will probably be of a similar scale and nature as those reported for 1970.

#### *Ethnology Division*

##### **Responsibilities**

Ethnographic research, salvage, preservation and display.

##### **Long-term Plans**

To execute comprehensive ethnographic research and salvage program for collection, evaluation and publication of information on the social, linguistic and material culture of the Eskimos and Indians of the Yukon and Northwest Territories and northern part of the provinces, in order to preserve their earlier traditions. The program will continue to be directed by staff members from the Ethnology Division, but a major part of the ongoing field work will be accomplished by contract ethnologists and will employ Eskimo and Indian assistants for short periods during each field year.

### Review of 1970 Operations

Ethnological study of the Ojibwa Indians of Northern Manitoba was undertaken for five months during the winter of 1969-70 by one member of staff. Another staff ethnologist carried out a four-month linguistic study at Anahim, Central British Columbia during the summer. Under contract, an Eskimo from Baker Lake continued the work of transcribing and translating Caribou Eskimo oral traditions at the National Museum of Man. One contractee reconstructed and documented a Labrador Eskimo semi-subterranean house at Port Burwell, Northwest Territories; another continued ethnographic field research among the Dogrib Indians of the Northwest Territories. One contract ethnologist with two assistants carried out research among the Han Athapascans of the Yukon Territory; another completed a study of Whaler-Eskimo contact in Hudson Bay. Three contractees carried on Indian studies in the northern part of the provinces. One additional contractee utilized institutional resources for studies of groups in these areas. The average period of research was four months.

### Plans for 1971

Ethnological field research will be undertaken for three months in the Arctic and 1-1/2 months in Northern Manitoba by individual staff members. Contract research in ethnology relating to the North is expected to be similar to that of 1970.

## NATIONAL MUSEUM OF NATURAL SCIENCES

### *Botany Division*

#### **Responsibilities**

The Botany Division of the National Museum of Natural Sciences has an overall interest in botanical exploration and research in Canada's North. The National Herbarium contains important collections of plants made in the Arctic during the past century. From time to time members of its scientific staff (curators and botanists on contract assignments) carry out field studies in the North. In addition, botanists from other institutions, both in Canada and abroad, regularly deposit original or duplicate sets of specimens in the National Herbarium.

#### **Long-term Plans**

The Botany Division plans to continue a general program of exploration, research and publication on the Botany of Arctic Canada and to co-operate with other institutions and individuals working in the same area.

#### **Review of 1970 Operations**

#### **Phycology Section**

Dr. R.K.S. Lee, Curator of Algae, conducted a continuing study of the benthic marine algae of the Canadian Arctic archipelago. Ecological data and specimens were collected during the field season of July from the southwestern section of the archipelago: Cape Parry, Pearce Point, De Salis Bay and Sachs Harbour.

As in previous field seasons, the Polar Continental Shelf Project provided logistical support from their field base at Tuktoyaktuk, N.W.T.

#### **Plans for 1971**

Due to other commitments, including a biological meeting seminar report on preliminary results of the museum's marine algae research in the Arctic, field studies in the region are being postponed to 1972.

### *Palaeontology Division*

#### **Responsibilities**

To collect Pleistocene vertebrate material from the Yukon Territory and to describe and catalogue it in an attempt to reconstruct the vertebrate history of the region during the ice age.

#### **Long-term Plans**

To continue field work on Pleistocene vertebrates in the Yukon Territory, specifically in the vicinities of Dawson City and Old Crow River, until good representative collections have been established.

#### **Review of 1970 Operations**

From August 9-18 field work was carried out in the Dawson City area of the Yukon, where three boxes of Pleistocene vertebrate specimens were collected.

#### **Plans for 1971**

C.R. Harington, with two assistants, plans to spend July 1 to August 15 collecting Pleistocene vertebrate remains along the Old Crow River, Yukon Territory. August 16 to 22 will be spent collecting fossils in the vicinity of Dawson City.

### *Zoology Section*

#### **Responsibilities**

The Zoology Section of the National Museum of Natural Sciences has broad interests in biological research in the Arctic and a tradition of research and exploration in Canada's North. Its scientific collections of Arctic material are among the best in the world. This institution maintains a co-operative attitude towards other government agencies and scientists of other countries interested in a better understanding of problems in the North.

### Long-term Plans

In May 1968, a biological station was established on Bathurst Island, N.W.T. There the Vertebrate Ethology Section is carrying on detailed long-term studies, under the general direction of S.D. MacDonald, which are designed to reveal important interrelationships that exist among species of Arctic animals and the morphological and behavioural adaptations that enable them to survive in high-Arctic environments. The program seeks to record phenological events over a period of at least ten years. It concentrates upon various levels—the individual organism, populations, and the ecosystem.

### Review of 1970 Operations

In 1970, the station on Bathurst Island was first occupied on April 12 and all personnel, except two who were to winter there, had left by August 22. All aspects of the research program went well and a large amount of new information was accumulated. Biologists from other government departments also participated as well as specialists from outside the government, including some from the United States. Canadian Broadcasting Corporation personnel spent ten days at the station filming part of a documentary. Publications on several aspects of the research have now gone to press in the form of interim reports or articles.

Projects investigated included:

- Ethology of rock ptarmigan—S.D. MacDonald.
- Ethology and annual cycle of the sanderling—Dr. David F. Parmelee.
- Ethology and ecology of muskoxen—David Gray.
- Competition and nutrition related to breeding success of three of jaegers—Philip Taylor.
- Census of breeding populations of Arctic birds, and life history of the red phalarope—Harold Mayfield.
- Breeding behaviour of the king eider—S.D. MacDonald and David Gill.
- Population studies of the collared lemming—David Gill.
- Preparation of tape recordings of Arctic sounds for the "Sounds of Nature Series".
- Ethology and life history of the ivory gull—S.D. MacDonald and David F. Parmelee.

In the period August 8 to October 1, Dr. D.J. Faber collected zooplankton between Beaufort Sea and Lancaster Sound on the CSS *Hudson*.

Mr. L.M. Marhue made a survey of the zooplankton of the Tuktoyaktuk region from July 6 to August 31.

In co-operation with the Fisheries Research Board, Dr. D.E. McAllister collected fishes in Frobisher Bay from August 5 to 29.

Dr. A.H. Clarke, assisted by Brian Kidd, collected abyssal benthic marine invertebrates from Baffin Bay on board CSS *Dawson*.

### Plans for 1971

Field investigations for 1971 include further ethological work on Bathurst Island by S.D. MacDonald and his associates; continued abyssal marine dredging in Baffin Bay and Labrador Sea by A.H. Clarke, and his associates; ornithological work by Henri Ouellet and Henry Hiemstra in the Great Whale River region, P.Q. and several curators plan to conduct a general biological survey of the Otish Mountains region in central Quebec.

## NATIONAL RESEARCH COUNCIL

### Responsibilities

To investigate various phases of pure and applied sciences in northern Canada.

### Long-term Plans

Several Divisions of the National Research Council have a continuing interest in the North.

The Division of Physics is involved in studies of space radiation from stations in northern Canada; these studies include ground-based cosmic ray observations and rocket measurements of charged particles in the earth's magnetosphere.

The Division of Building Research conducts studies of permafrost, snow and ice and northern building problems.

The Radio and Electrical Engineering Division carries out radio and optical measurements of upper atmospheric phenomena; for example, auroral and air-glow observations.

The Space Research Facilities Branch operates the Churchill Research Range, the Great Whale Geophysical Station, and a launching facility at Resolute Bay, and co-ordinates scientific programs undertaken at these and other locations in Canada.

Other Divisions of the National Research Council become involved periodically with northern work on a short-term basis.

### Review of 1970 Operations

#### Division of Physics

Continuous monitoring of cosmic ray intensities was carried out at five stations in Northern Canada (Resolute, Churchill, Alert, Inuvik and Goose Bay). This work is part of an international program based on a network of cosmic ray stations and is carried out in collaboration with Atomic Energy of Canada Limited, Chalk River, and the Southwest Center for Advance Studies, Dallas, Texas.

During 1970, experiments were flown on several rockets from Fort Churchill; among other things these experiments have yielded new information on the origin of particles responsible for aurora and the Van Allen radiation belts.

#### Division of Building Research

Investigations of the nature and distribution of permafrost were initiated or continued at several widely separated locations in northern Canada. Ground temperature cables, etc. were installed and observations begun at seven micro-wave stations on mountain summits in British Columbia, at four more sites (total of eight) near Yellowknife, and at three locations near Cambridge Bay. Surveys of surface features and permafrost were conducted at the IBP study site on the north coast of Devon Island and an aerial reconnaissance was carried out in the Kettle Lake IHD water basin study area in Manitoba to select sites for future investigations. The Division participated in arrangements made by the Geological Survey of Canada to test the suitability of a commercially developed airborne radio phase device to detect permafrost. Flights were made at several locations in northern Manitoba, including Thompson and Kelsey.

Operation of a small field station was maintained at Thompson, Manitoba to provide support for various engineering and terrain studies of permafrost being carried out in northern Manitoba. Investigations of micro-climate and terrain factors affecting the distribution of permafrost in the discontinuous zone were continued and expanded at a special test site at Thompson.

Field tests to determine the capacity and creep behaviour of several types of anchor in permafrost were completed at Thompson. Observations of the performance of previous dykes on thawing permafrost at the Kelsey and Kettle Generating Stations on the Nelson River were continued in co-operation with Manitoba Hydro. Contact was maintained and assistance given to the federal Department of Public Works in a co-operative study of a buried water supply line at Churchill, Manitoba.

Studies were conducted throughout the year at Inuvik to assess the performance of several buildings supported by pile foundations or duct ventilated gravel pads. Studies of the effect of terrain disturbance and observations of changes in the ground thermal regime at the Inuvik airstrip, which was paved in 1969, were continued. A general investigation into the hydraulic, thermal and structural aspects of hot (oil) pipelines

in permafrost was undertaken to assist in identifying the more important geotechnical problems associated with pipelines in northern Canada. Contact was maintained with the petroleum industry groups who are operating test pipelines in permafrost.

Studies of the engineering problems associated with lake and river ice and analysis of data obtained from many locations in Canada, including northern areas, were continued. This work involves the evaluation of ice pressures on structures, the bearing capacity of ice covers and the prediction of break-up dates of lakes and rivers and the control of river ice.

Advice and assistance was given on a number of northern building and geotechnical problems brought to the Division by various engineering firms and federal and provincial departments and agencies.

### **Radio and Electrical Engineering Division**

During 1968, DA-3 auroral all-sky cameras were in operation at Poste-de-la-Baleine (Great Whale River), Quebec, Moosonee, Ontario, and Churchill, Manitoba. The Great Whale cameras were used on a conjugate-point program with identical cameras being exposed at Byrd Station in the Antarctic. Photo-electric auroral photometers, utilizing interference filters, were also used at Great Whale and Byrd.

Instrumental auroral observations in the visible region of the spectrum were made during March, 1970, from the Auroral Observatory at Fort Churchill, Manitoba. A network of Meteorological stations in the North made visual auroral reports throughout the year.

Auroral radar equipment was operated at Poste-de-la-Baleine, Quebec and at Churchill and Thompson, Manitoba. During 1970, plasma probes were placed in five rockets fired at Churchill. Micrometeoroid detectors were placed on two rockets fired at Churchill.

### **Space Research Facilities Branch**

The Council through its Space Research Facilities Branch continued to operate Churchill Research Range in conjunction with the National Aeronautics and Space Administration of the United States until 30 June 1970. Since that date, Canada has operated a considerably smaller range facility because of Canadian financial restrictions. Programs include the launching of sounding rockets and balloons to investigate geophysical phenomena in the upper atmosphere on behalf of scientists from Canada, the United States and other countries. Associated ground-based experiments are also carried out by scientists from various universities participating in the rocket program.

No rockets were launched from Resolute during 1970.

The Space Research Facilities Branch is also responsible for the co-ordination of various co-operative scientific programs at the Great Whale Geophysical Station. These facilities have been used occasionally in connection with balloon launches from the Churchill Research Range.

### **Plans for 1971**

#### **Division of Physics**

Both the rocket program and the cosmic ray monitoring program will continue in 1971 at about the same level. A co-operative rocket experiment involving several Canadian universities is planned to study auroral sub-storms. The experiment will involve the near simultaneous launch of two rockets from Churchill and possibly one rocket from Gillam, Manitoba.

#### **Division of Building Research**

Studies of the performance of engineering structures and facilities founded on or in permafrost will be continued at Inuvik, N.W.T. and Thompson, Gillam and Churchill, Manitoba. Contact will be maintained and it is anticipated that co-operative field studies and experiments on pipelines in permafrost areas will be undertaken with the petroleum industry. Installations will be made and experiments conducted to evaluate the effects of heat transfer and frost heave forces on foundations in permafrost at Thompson, Manitoba. Field tests will also be made at Thompson to assess the suitability of and to develop methods and techniques for the use of pressuremeters and penetrometers to determine the mechanical properties and behaviour of frozen ground in situ.

Surveys of the nature and distribution of permafrost will be continued at various locations, including Yellowknife, Cambridge Bay, British Columbia and Devon Island, and ground temperature cables will be installed in the mountainous regions of British Columbia, on Devon Island and at Churchill and Rankin Inlet. The micro-climate and terrain studies of permafrost at Thompson will be continued. The Thompson Field Station will be maintained as a support facility for field projects carried out in northern Manitoba.

### **Radio and Electrical Engineering Division**

Instrumental equipment for the observation of aurora and airglow will continue in use at Poste-de-la-Baleine, Churchill, Thompson, and Moosonee on a routine basis. Auroral observations in the visible and infrared regions of the spectrum will be made during February and March of 1971 from the Auroral Observatory at Fort Churchill, Manitoba. It is hoped that auroral observations from on board the NASA Convair 990 jet aircraft will be made near the end of 1971. Automatic auroral photometers will be installed at three locations in the Belcher Islands during the summer season. Use of upper-air rockets will continue, with emphasis on research using plasma probes and micrometeoroid detectors.

### **Space Research Facilities Branch**

Operation of the Churchill Research Range will be continued for the launching of sounding rockets and balloons to investigate geophysical phenomena in the earth's atmosphere and in space on behalf of scientists from Canada, the United States and other countries.

Four Black Brant IIIB rockets are scheduled for launching from Resolute, N.W.T. during September – November 1971. These vehicles will be launched by Goddard Space Flight Center/NASA with NRC providing operational and safety control.

During March, 1971, NASA plans to launch eight Nike Tomahawk rockets from Hall Beach, N.W.T. with NRD providing safety co-ordination.

In preparation for a proposed rocket launching from Gillam, Manitoba early in 1972, site preparation and installation of equipment will be undertaken during 1971.

Preliminary survey and site preparation arrangements have been carried out at Eskimo Point, N.W.T. in support of the proposed launching of a rocket into the July 1972 eclipse of the sun. The rocket would carry experiments provided by scientists from Canada, the U.S. and the U.K. Dependent upon project approval, final preparations and equipment installation are planned for the summer of 1971.

The Great Whale Geophysical Station will continue its work of auroral photography and photometry, and making a variety of radio-frequency measurements for Canadian and U.S. agencies. Most of these measurements are correlated with measurements made at Byrd Station in Antarctica, which is at the geomagnetic conjugate point of Great Whale. Facilities at Great Whale will be used as required to supplement those at Churchill Research Range in conjunction with rocket and balloon-borne experiments. Support will also be provided to a NASA/Federal German Republic Barium Cloud Seeding experiment to be launched from Wallops Island, U.S.A. in April or May 1971.

## NORTHERN CANADA POWER COMMISSION

### Responsibilities:

To provide Public Utilities in the Yukon and Northwest Territories as authorized by the Governor-in-Council. To operate each plant from consumer revenue on a self-sustaining basis including repayment of capital expenditures.

### Long-term Plans

Forecast and normal planning in order to establish, maintain, and expand electrical and utility requirements.

### Review of 1970 Operations

#### 1. *Snare/Yellowknife, N.W.T.*

- (a) The installation of a 5150 kw diesel electric generating unit was completed in a new building to supplement the standby and peaking capacity for the Yellowknife area.
- (b) The installation of a 34.5 kv transmission line from the standby diesel plant to the 115 kv terminal was completed.
- (c) Construction of three new employee's housing units was completed.

#### 2. *Fort Smith/Pine Point/Taltson, N.W.T.*

- (a) The installation of a 1500 kw gas turbine unit was completed to supplement standby capacity in Fort Smith.
- (b) The construction of a new standby powerhouse building at Pine Point was completed.
- (c) The installation of a 5150 kw diesel electric generating unit in the new powerhouse building at Pine Point was partially completed to provide a source of standby power for Pine Point and Pine Point Mines. The installation will be completed in early 1971.

#### 3. *Whitehorse/Faro, Y.T.*

- (a) The installation of an additional 5150 kw of diesel electric generating capacity in the Whitehorse diesel

plant was completed thereby increasing installed generating capacity at Whitehorse to 14,200 kw.

- (b) The installation of a 5150 kw diesel generating unit at Faro was partially completed to provide a standby power supply for Faro and Anvil Mines. The installation will be completed in early 1971.
- (c) The installation of a remote control (start-stop) system for the operation of the Whitehorse diesel plant from the hydro plant control room was initiated and is expected to be completed in mid 1971.

#### 4. *Inuvik, N.W.T.*

- (a) The construction of a new diesel powerhouse building was completed.
- (b) The installation of a 5150 kw diesel electric generating unit in the new powerhouse building was partially completed. On completion in early 1971, the installed generating capacity in Inuvik will be increased to 9600 kw.
- (c) A 3000' extension to the sewer and water utilidor for N.W.T. Government was installed.
- (d) 6 unit row housing for NCPC staff was completed.
- (e) The erection of a 1,000,000 gallon fuel storage tank was completed.

#### 5. *Frobisher Bay, N.W.T.*

- (a) The installation of a 3920 kw diesel electric generating unit was completed, thereby increasing the installed generating capacity to 9500 kw.
- (b) Electrical, heat, water and sewage services were extended to the new stores building, recreation centre, and vocational school.

#### 6. *Fort Resolution, N.W.T.*

- (a) Construction of a single phase, ground-return, 34.5 kv transmission line from Pine Point to Fort Resolution

was partially completed. The line will be energized early in 1971 thereby providing a source of hydro power to the community. The existing diesel plant will be operated in the future on an emergency basis only.

7. *Dawson, Y.T.*

- (a) Automation of a 500 kw diesel electric generating unit in the existing powerhouse building was completed thereby providing for 16 hour unattended operation.

8. *Norman Wells, N.W.T.*

- (a) The installation of an additional 600 kw diesel electric generating unit was completed, thereby increasing the installed generating capacity to 1400 kw.

9. *Fort Norman, N.W.T.*

- (a) The Commission arranged for the installation of a 150 kw diesel electric generating unit at Fort Norman, at the request of the N.W.T. Government, to augment existing generating capacity.
- (b) Preliminary arrangements were completed, prior to assuming responsibility for the supply and distribution of power at Fort Norman early in 1971.

10. *Fort Franklin, N.W.T.*

- (a) The Commission arranged for the installation of a 150 kw diesel electric generating unit at Fort Franklin, at the request of the N.W.T. Government, to augment existing generating capacity.
- (b) Preliminary arrangements were completed prior to assuming responsibility for the supply and distribution of power at Fort Franklin early in 1971.

11. *Tuktoyaktuk, N.W.T.*

- (a) The Commission arranged for the installation of a 150 kw diesel electric generating unit at Tuktoyaktuk, at the request of the N.W.T. Government, to augment existing generating capacity.
- (b) Preliminary arrangements were completed, prior to assuming responsibility for the supply and distribution of power at Tuktoyaktuk in 1971.

## Plans for 1971

1. *Snare/Yellowknife, N.W.T.*

- (a) The installation of a remote control (start-stop) system for the operation of the standby diesel plant from the Yellowknife Control Centre.

- (b) Reconstruction of the 115 kv terminal station to provide for additional transmission facilities of Yellowknife.

2. *Taltson/Fort Smith/Pine Point, N.W.T.*

- (a) Purchase and installation of a 5 kv on circuit breaker at Fort Smith to isolate Fort Smith distribution and standby diesel generating equipment from the 115 kv transmission line from Taltson hydro plant.
- (b) Installation of a new building to house & standby diesel generating unit, storage, and garage.
- (c) Completion of the installation of a 5150 kw diesel electric generating unit at Pine Point, which commenced in 1970.

3. *Mayo, Y.T.*

- (a) Investigate and implement automation of the hydro plant to provide for unattended operation and future remote control of the plant.

4. *Fort Simpson, N.W.T.*

- (a) Construction of a new powerhouse building.
- (b) Installation of a new 100 kw diesel generating unit in the new powerhouse.
- (c) Automation of the new 1000 kw diesel generating unit to provide for 16 hour unattended operation.

5. *Whitehorse/Faro, N.W.T.*

- (a) Complete installation of remote control system for operation of the diesel plant from the hydro plant control room.
- (b) Automation of two diesel units to provide for 16 hour unattended operation.
- (c) Fencing and landscaping of hydro and diesel plant area, following completion of extended construction period.
- (d) Complete the installation of a 5150 kw diesel electric generating unit at Faro, which commenced in 1970.

6. *Inuvik, N.W.T.*

- (a) Expansion of the power distribution system to provide for two additional feeders from the generating plant.
- (b) Installation of a new 90,000,000 BTU per hour High Temperature Water generator in the new power plant building.
- (c) Provision of a fuel off-loading dock to facilitate unloading of fuel to the diesel and steam plants.
- (d) Completion of the installation of a 5150 kw diesel electric generating unit, which commenced in 1970.

- (e) Commissioning of the 1970 sewer and water extension and installation of an additional 2000' of similar service.

7. *Frobisher Bay, N.W.T.*

- (a) Installation of an automatic fire extinguishing system in the power plant building.
- (b) Installation of a heat exchanger for steam to high temperature water to augment the existing high temperature water system.
- (c) Provision of high temperature water, sewer and services for new elementary school — this project on behalf of Department of Public Works/Northwest Territories Government.

8. *Fort McPherson, N.W.T.*

- (a) Purchase and installation of two 375 kw generators to be installed on existing diesel units and replace existing 250 kw generators.
- (b) Automation of diesel plant to provide for 16 hour unattended operation.

9. *Fort Resolution, N.W.T.*

- (a) Automation of standby diesel plant to provide for 16 hour unattended operation.
- (b) Completion of the 34.5 kv transmission line between Pine Point and Fort Resolution, which commenced in 1970.

10. *Dawson, Y.T.*

- (a) Purchase and installation of new steam boiler for heating of community water system, as requested by Y.T. Government.
- (b) Installation of additional 500 kw diesel unit and automation of unit to provide for 16 hour unattended operation.

11. *Coppermire, N.W.T.*

- (a) Installation of an additional 250 kw diesel electric generating unit.
- (b) Automation of new diesel unit to provide for 16 hour unattended operation.
- (c) Purchase and installation of 375 kw generator to be installed on an existing diesel unit and replace an existing 250 kw generator.

12. *Cambridge Bay, N.W.T.*

- (a) Installation of an additional 560 kw diesel electric generating unit to replace an existing 250 kw unit.

- (b) Automation of new diesel unit to provide for 16 hour unattended operation.

13. *Norman Wells, N.W.T.*

- (a) Construction of one employee's housing unit.

14. *Baker Lake, N.W.T.*

- (a) Automation of existing powerhouse to provide for 16 hour unattended operation.

15. *Chesterfield Inlet, N.W.T.*

- (a) Construction of a new combined garage, storage space and diesel plant building.
- (b) Installation of an additional 200 kw diesel electric generating unit in the new building.
- (c) Automation of the new diesel unit to provide for 16 hour unattended operation.

16. *Fort Good Hope, N.W.T.*

- (a) Construction of one employee's housing unit.
- (b) Installation of a new 300 kw diesel electric generating unit, including automation to provide for 16 hour unattended operation.

17. *Tuktoyaktuk, N.W.T.*

- (a) Assume responsibility for supply and distribution of power in Tuktoyaktuk.
- (b) Commence construction of a 69 kv transmission line from Inuvik to Tuktoyaktuk, thereby servicing community from Inuvik and eliminating necessity of operating diesel plant at Tuktoyaktuk.

18. *Fort Franklin, N.W.T.*

- (a) Assume responsibility for supply and distribution of power in Fort Franklin.
- (b) Installation of additional 150 kw diesel electric generating unit to augment existing facilities.

19. *Fort Norman, N.W.T.*

- (a) Assume responsibility for supply and distribution of power in Fort Norman.
- (b) Installation of additional 200 kw diesel electric generating unit to augment existing facilities.

20. *Aklavik, N.W.T.*

- (a) Purchase and installation of one 375 kw generator to be installed on an existing diesel unit and replace an existing 250 kw generator.
- (b) Automation of diesel plant to provide for 16 hour unattended operation.

## 21. *General Investigations*

- (a) Investigation, feasibility and environmental studies related to hydro development at some 5 possible sites in the N.W.T. and Yukon, along with transmission line grid and interconnection studies will continue.

## REVIEW OF 1970 OPERATIONS

## Northwest Territories

PLANT	UTILITIES	CAPACITY	KWH OUTPUT	STAFF	CONSUMERS
Taltson (Hydro)	Power	25,000 HP	99,880,087	(12	2 (Wholesale)
Fort Smith Distribution System (Diesel) (Gas Turbine)		960 KW 1,500 KW		( ( (	747
Pine Point Distribution System				(	314
Inuvik (Diesel & Steam)	Power Heat Water & Sewerage Mtce. Services	4,500 KW	16,270,100	38	937 1194 106 151
Fort McPherson (Diesel) (Operated for I.A.N.D.)	Power, Heat Water, Sewerage Mtce. Services	750 KW		7	175
Fort Simpson (Diesel)	Power, Heat Water, Sewerage Mtce. Services	1,500 KW	2,852,065	25	300 230 70
Aklavik (Diesel) (Operated for IAND)	Power	760 KW	1,070,906	4	60
Frobisher Bay (Diesel)	Power, Heat Water, Sewerage	5,600 KW	12,675,140	31	748
Fort Resolution (Diesel)	Power	450 KW	886,483	3	138
Chesterfield Inlet (Diesel)	Power	400 KW	720,000	2	46
Snare River (Hydro) (Snare Rapids) (Snare Falls) Standby Diesel	Power	17,550 HP 6,000 KW	88,876,305	( ( (14	4 (Wholesale)
Rae Distribution System	Power				175
Cambridge Bay (Diesel)	Power	1,200 kw	2,101,065	4	58
Coppermine (Diesel)	Power	600 kw	922,640	4	117
Baker Lake (Diesel)	Power	1,380 kw	1,887,434	4	62
Fort Good Hope (Diesel)	Power	375 kw	529,534	1	51
Norman Wells (Diesel)	Power	1,400 kw	2,239,780	2	46
Yukon Territory					
Máyo (Hydro)	Power	6,000 HP	35,294,825	7	194 2 (Wholesale)
Whitehorse (Hydro) Diesel	Power	26,000 HP 9,000 kw	144,072,640	15	6 (Wholesale)
Faro Distribution System				1	159
Dawson (Diesel)	Power Water & Sewerage	1,250 kw			(425) 725 Total (300)

## NORTHERN TRANSPORTATION COMPANY LIMITED

### **Responsibilities**

To act as a common carrier of freight within the Mackenzie River watershed under the jurisdiction of the Canadian Transport Commission.

To distribute freight by sea from Tuktoyaktuk to the DEW Line stations and other populated areas in the Western Arctic.

### **Long-term Plans**

Normal planning to meet responsibilities plus advance planning to have sufficient equipment available to meet anticipated expansion of the oil exploration programs and other requirements.

## POST OFFICE DEPARTMENT

### Responsibilities

To provide mail service to and from post offices in the Yukon and Northwest Territories.

### Long-term Plans

To provide adequate mail service, subject to the availability of transportation, at an equitable cost.

### Review of Operations

### Transportation

The following table lists the scheduled air and surface mail transportation services on which mail was conveyed to and from the Yukon and Northwest Territories. The expenditures for the fiscal year 1969-70 are shown.

### YUKON

#### Air Transportation

Dawson — Old Crow	\$ 33,505.30
Dawson — Clinton Creek	564.30
Vancouver — Whitehorse	809,114.99
Whitehorse — Dawson	14,063.17
Whitehorse — Ross River	4,892.83
<b>Total</b>	<b>\$862,140.59</b>

#### Surface Transportation

Atlin and Whitehorse	\$ 12,064.00
Dawson Creek and Clinton Creek	4,732.00
Dawson Creek and Whitehorse	89,800.00
Maya and Elsa	3,361.96
Watson Lake and Tungsten	2,340.00
Whitehorse and Alaska HS	10,420.00
Whitehorse and Dawson HS	17,363.00
Whitehorse and Faro	4,250.00
Post Office to Airport Services	8,765.00
Whitehorse Rural Route No. 1	4,680.18
<b>Total</b>	<b>\$157,776.14</b>

Total expenditure for mail service to and from the Yukon Territory \$1,019,916.73

### NORTHWEST TERRITORIES

#### Air Transportation

Edmonton — Mackenzie River Area	\$ 721,484.39
Fort Churchill — Baker Lake — Coral Harbour	58,712.92
Fort Nelson — Fort Liard	1,487.20
Inuvik — Sachs Harbour	3,958.80
Mackenzie Delta — Coppermine	60,945.23
Montreal — Resolute	564,202.51
Resolute Area	47,079.90
Yellowknife — Port Radium	3,616.80
Yellowknife — Snowdrift	911.23
Yellowknife — Discovery (Discovery P.O. closed June 10)	160.50
<b>Total</b>	<b>\$1,462,559.48</b>

#### Surface Transportation

Hay River and Rae	\$ 4,500.00
Peace River and Hay River	49,342.90
Post Office-to-Airport Services	38,622.30
<b>Total</b>	<b>\$ 92,465.20</b>

Total expenditure for conveyance of mail to and from the Northwest Territories \$1,555,024.68

### Expenditures For Salaries

Northwest Territories	\$ 295,054.96
Yukon Territories	274,192.71

### Revenue

Northwest Territories	\$ 312,000.00
Yukon	269,000.00

### New Post Offices

Arctic Bay, N.W.T.	<b>Opening Date</b> 1 October 1970
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## ROYAL CANADIAN MOUNTED POLICE

### Responsibilities

The basic responsibility of the Royal Canadian Mounted Police in the Yukon Territory and the Northwest Territories is the preservation of peace, and the maintenance of law and order. The force is the only law enforcement agency in the North, and is responsible for the enforcement of all federal statutes, territorial laws, and through agreement with six municipalities, the enforcement of municipal by-laws in the communities of Dawson, Whitehorse, Yellowknife, Hay River, Fort Smith and Inuvik.

### Long-term Plans

Long-term plans include the establishment of new detachments as priorities dictate. This facet of our organization is continually under review because of population migration in the Yukon and Northwest Territories geared to oil and mineral exploration and other forms of economic development.

### Review of 1970 Operations

Construction of the new administration building at Yellowknife, N.W.T. was completed during the spring of 1970 and it was officially opened on June 20. The new building houses Yellowknife sub-division headquarters, Yellowknife detachment, single quarters, identification section, telecommunications section and guardroom facilities.

Mineral exploration and production in the Faro, Y.T. area necessitated the establishment of a two-man detachment at that point.

### Plans for 1971

Plans for 1971 include the construction of married quarters and detachment/single quarters at Faro, Y.T.

A new administration building at Frobisher Bay will be completed in 1971. It will accommodate Frobisher Bay sub-division headquarters, Frobisher Bay detachment, single quarters, telecommunications section and guardroom facilities.

## UNEMPLOYMENT INSURANCE COMMISSION

### Responsibilities

To administer the Unemployment Insurance Act and to provide benefit to workers in the area under provisions of the Unemployment Insurance Act. The district office of the Commission in Prince George, B.C. serves the Yukon Territory. The district office in Edmonton, Alberta serves the Districts of Mackenzie and Franklin except for Baffin Island in the Northwest Territories. The district offices in Winnipeg, Manitoba and Montreal, Quebec serve the District of Keewatin and Baffin Island respectively.

### Long-term Plans

To provide and maintain a good standard of service through periodic studies and observation of changing situations.

### Review of 1970 Operations

Since the introduction of a general system of service by mail some years ago, the Canadian public has dealt with the Commission by mail concerning all unemployment insurance matters. The Commission operates district offices only in the larger centres but have employees who travel throughout the areas to conduct audits and interviews with a view to ascertaining adherence to the requirements of the Act. Unemployment insurance services were provided to the population in the Yukon and Northwest Territories during the year 1970, through the above-noted offices. In addition, agents have been appointed to assist the people in completing their application forms for benefit. In the Northwest Territories the Commission has agents at Yellowknife and Hay River.

### Plans for 1971

To continue the normal operation of the unemployment insurance services and to make improvements wherever necessary.

### Review of 1970 Operations

Tonnage handled by the Company within the Mackenzie River watershed and the Western Arctic for 1970 amounted to

280,736 tons, an increase of 9.5% over the 1969 total of 256,354 tons. Traffic into the Lake Athabasca region also showed a slight increase of 2.1%, while the Alaska region showed a reduction from 26,000 tons in 1969 to 9,000 tons this past year.

Increase in the Mackenzie sector can be attributed to the oil industry, while the reduction in shipping to Alaska was due to the curtailment of general activities on the North Slope, pending a decision on an oil pipeline.

Water levels on the Mackenzie and Athabasca River systems showed very little improvement over 1969. Damage to equipment, however, was effectively curtailed by further reducing the loaded draft at the terminals.

Seasonal ice conditions in the Beaufort Sea and the eastern end of the Western Arctic were excellent.

### Plans for 1971

Capital expenditures for the coming year are estimated at \$4,000,000 and the program will include \$1,000,000 for completion of the Syncrolift installation, \$900,000 for the development of a marine repair depot at Hay River and \$692,000 for the upgrading and extension of freight facilities at Inuvik, Hay River, Tuktoyaktuk and Bear River.

**Revenues and Expenditures in the North  
Fiscal Year 1969-70**

Department or Agency	Northwest Territories		Yukon Territory	
	Revenues	Expenditures	Revenues	Expenditures
Agriculture		932,000		451,000
Canadian National Railways		NOT AVAILABLE		
Canadian Transport Commission				
Central Mortgage and Housing	870,000	3,116,000	827,000	2,785,000
Communications	46,000	630,000	9,500	32,000
Crown Assets Disposal Corporation	134,875		427,610	
Dominion Bureau of Statistics				
Eldorado Nuclear Ltd.				
Energy, Mines and Resources	50,000	5,856,119	25,000	791,728
External Affairs				
Fisheries and Forestry	10,050	328,900	18,509	42,428
Indian Affairs and Northern Development	4,500,354	22,610,306	4,615,789	10,147,195
Justice	45,271	358,529	68,563	199,481
Labour				
Manpower and Immigration		242,261		590,519
Ministry of Transport	7,970,000	29,800,000		
National Defence		95,457		500,000
National Health and Welfare	1,805,000	6,923,000	717,000	2,404,000
National Museums of Canada		230,250		9,800
National Research Council		400,000		100,000
National Revenue		NOT AVAILABLE	589,923	292,852
Northern Canada Power Commission	6,775,733	6,151,492	2,280,814	1,458,677
Northern Transportation Company Limited	7,794,941	7,460,600		
N.W.T. Government	36,385,955	41,279,318		
Post Office	312,000	1,850,079	269,000	1,294,109
Public Works	560,000	1,953,000	665,000	13,987,000
Royal Canadian Mounted Police	1,068,448	2,750,150	72,049	972,937
Unemployment Insurance Commission		NOT AVAILABLE		
Yukon Government			25,720,726	23,383,654

<sup>1</sup> The financial statements were obtained from the departments and agencies concerned.









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~~Advisory Committee~~  
~~on Northern Development~~  
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